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THIRD SERIES.

VOLUME XVII.

1886-87.

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THOMAS HUBBUCK & SON, 24, Lime Street, LONDON.

Illustrated Price List free by post.

SHIRLEY'S A 1 BRAND is composed solely of Pure Japanese Menthol, and there being a lot of inferior Menthol in the market, BEWARE OF CHEAP BRANDS.

SHIRLEY'S MENTHOL CONES.

25/- worth of SHRLEY'S A 1 BRAND MENTHOL will realise 48/-, or a Profit of 23/-, which is over 90 °/₀; therefore send a cheque for 25/- and I will forward either of the following parcels:—

PARCEL A.	PARCEL B.	PARCEL C.	PARCEL D.
4 doz. 6d.	3 doz. 1/-	8 doz. 6d.	4 doz. 1/-
2 ,, 1/-	2 ,, 6d.		

together with a Handsome Glass-fronted Show Case and Round Handbills, which are bound to increase the sale.

Order as A 1 BRAND, *of all Wholesale Houses, or direct of*

J. G. SHIRLEY, 30, Paternoster Square, E.C.

AGENTS WANTED.

For the Radical Cure of Varicose Veins, Ulcers, Eczema, and other Diseases of the Leg and Joints, use only the

"GENUINE"

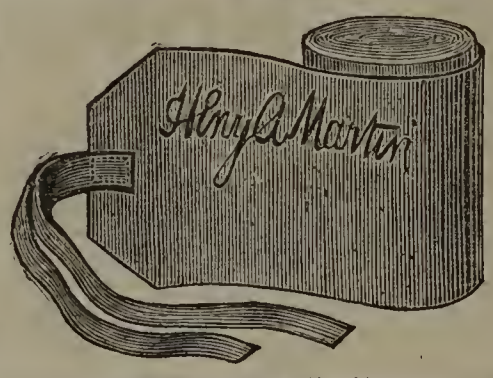
DR. HENRY A. MARTIN'S PURE RUBBER BANDAGES,

Bearing his Signature in **Carmine Ink** stamped on each Bandage. Are the **BEST** and **CHEAPEST.**

PRICES LOWER THAN ALL OTHERS.

No.	Length.	Width.	Quality.	Price.
1	10½ feet	3 inches	Thick	7/3
1A	10½ ,,	3 ,,	Medium	6/0
1B	10½ ,,	3 ,,	Thin	4/3
2B	21 ,,	3½ ,,	,,	10/0
3	6 ,,	2¼ ,,	Thick	3/6

Trade Discount:—**20** per cent. from above prices.
Special Discount for large quantities.



Pamphlet on application.

No.	Length.	Width.	Quality.	Price.
3A	6 feet	2¼ inches	Medium	2/9
8	14 ,,	3 ,,	Thin	6/0
9A	21 ,,	3 ,,	Medium	11/6
10	12 ,,	2 ,,	Thick	6/0

CAUTION.—*See that each Bandage you order has name stamped on, refuse all others, which must be imitations.*

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KROHNE & SESEMANN,
Surgical Instrument Manufacturers,

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LEMAITRE & CO.

Successors to the late
Filmer Kidston,

Medical and General Shop Fitters, &c.

Send for our Illustrated List of Superior Shop Fittings and Cases, and our advertised Fittings for Chemists' Shops as supplied for £50 and £100 cash.

W. HAWKE & SON

SHOP FITTERS AND SHOP-FRONT BUILDERS

WILD COURT, GREAT WILD STREET, DRURY LANE, LONDON, W.C.

Medical Glass, Earthenware, Utensils, &c.

CLOSED AT 5 P.M.; SATURDAYS, 12 A.M.

£45

Complete Fittings for Chemist's Shop, fixing included.

SAVE 25 PER CENT.

J. & W. BYGRAVE, Shop Fitters,

Curzon Street, Wenlock Street, Hoxton, London, N.

Extracts from a few letters out of some hundreds received:—

From Mr. James, Chemist, 260, Upper Street, Islington, N.

"I feel it is only due to you to say that this is now the third shop you have fitted for me to my entire satisfaction, and at prices considerably below other fitters."

From Mr. Alexander, Chemist, Banff.

"The screen and counter case came to hand yesterday. I am very well pleased with them both; and when I get them fitted up they will have a very effective appearance."

From Mr. Freeman, 89, Linthorpe Road, Middlesbro'.

"I am delighted with the wall-fitting; it is well worth what I paid you for it."

From Mr. Kay, Chemist, 143, Northenden Road, Sale, Cheshire.

"The drawers arrived on Friday, and glass cases yesterday, quite safe. I am very much pleased with the work, and shall be glad to answer any references."

THE ART JOINERY WORKS. | BOWLING & GOVIER, Medical Shop Fitters and Shop Front Builders,

GUN STREET, BRUSHFIELD, BISHOPSGATE, LONDON.

I am not only pleased, but delighted, with the shop you have just fitted for me.
A. Wall, Bromley, Kent.

For Chemists' Shop Fittings, I consider your style and workmanship unique.
Wilson & Son, Chemists, Harrogate.

Both my shops at Westgate and Clacton-on-Sea are much admired, and I am well pleased with your work.
C. H. Grosvenor, Chemist, Clacton-on-Sea.

You have now fitted up three shops for me, each one having given me greater satisfaction: and if I required 20 shops I should put them into your hands to fit up.
I. H. Bateman, Brondesbury, Kilburn.

Your Pharmaceutical Dispensing Counter I consider complete in every detail, and great care appears to have been taken in packing.
H. B. Williamson, Wanganui, New Zealand.

Your workmanship is excellent, and was completed with promptitude and dispatch.
F. J. Clarke, Bracebridge Hall, Lincoln.

You may refer any applicant who requires his shop fitted to me. I am perfectly satisfied with the work done and the amount charged. The shop is universally admired.
J. Herington, Leighton Buzzard.

I consider your design and workmanship unequalled for Chemists' Shop Fittings, and I shall be pleased to recommend you.
C. Robinson, Streatham.

My shop at Wimbledon has been much admired, and I am very pleased with the manner in which you have executed the work.
D. C. Cadman, Blackheath.

SHOP FITTINGS. — **SAMUEL HOWLETT** — *Established* 1830.

4, LINDLEY STREET (formerly called North Street), SIDNEY STREET, MILE END, LONDON, E.

A few minutes' Ride by Omnibus from the Bank.

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Shops fitted by S. H., and to whom references are kindly permitted:—

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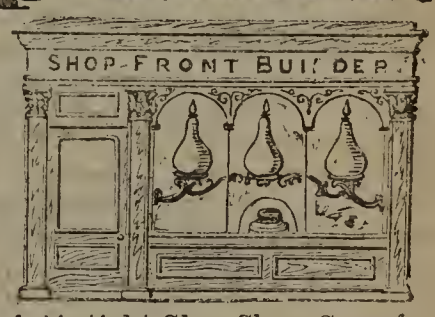
,, John Broad, Rise House, Hornsey Rise, N.
,, N. Nicholson, Canonbury, London.
&c. &c. &c.

Messrs. Leath & Ross, St. Paul's Church Yard, London.
,, Harvey & Reynolds, Leeds.
Mr. W. F. Smith, 280 Walworth Road, S.E.
,, Thomas Hall, Lowestoft.
&c. &c. &c.



Cabinet Fitter to the Pharmaceutical Society of Great Britain. Manufacturer of every description of Air-tight Glass Show-Cases for Chemists, Jewellers, &c. Medical Labelling, &c. Plans and Estimates for Entire Fittings and Alterations supplied.

GEORGE TREBLE & SON, Medical Shop Fitters & Plate Glass Show Case Makers.

Established over 40 Years.

The Offices of the Pharmaceutical Society, London, and the Show Room, Surgical Instrument Department, and Counting House of Messrs. Maw, Son and Thompson, Aldersgate Street, E.C., were fitted up by us, and prove our reputation in this branch of our business. We have also large numbers of testimonials expressing satisfaction with work done by us in all parts of Great Britain and Ireland, and for the Colonies.

George Treble & Son will have pleasure in waiting on firms about to furnish or make alterations, and supply them with Designs, Plans, Estimates, and all necessary information, *free of charge.*

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SOLUBLE PODOPHYLLIN.

LIQ. PODOPHYLLIN HOCKIN

THIS PREPARATION CONTAINS NO COLOURING MATTER.

Miscible (bright) with Water, Acid, or Alkaline Solutions, also with Decoctions, Æthers, Infusions, Tinctures, etc. One Drachm equal to Podophyllin pur $\frac{1}{4}$ grain.

LIQ. PODOPHYLLIN (HOCKIN) is offered as a solution of Pure Podophyllin, easily and elegantly dispensed with other drugs, or simply diluted (one drachm to half ounce of water) as a reliable remedy in gastric disturbances generally consequent upon torpidity of the liver, and should be on every dispensing counter.

We shall be glad to forward Sample and Pamphlet Free on Application.

Price for Dispensing, 16 oz. Bottles, 7/-; 8 oz. Bottles, 4/-; 4 oz. Bottles, 2/6. Larger Bottles, 6/9 per lb.
All bottles & packing free, postage only charged as follows: 16 oz. & 8 oz. bottles, 6d.; 4 oz. bottles, 3d. extra.

PREPARED ONLY BY

HOCKIN, WILSON & CO. Wholesale Druggists and Manufacturing Chemists,

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BULLOCK'S PEPSINA PORCI

Dose— 2 to 4 grains.

Since the introduction by Dr. LIONEL BEALE of PEPSINA PORCI, Mr. BULLOCK has devoted special attention to its manufacture.

BULLOCK'S ACID GLYCERINE OF PEPSINE

Dose— 1 to 2 drms.

Possesses at least three times the digestive power (and in most cases considerably more) than any other preparation of Pepsine and Glycerine, or fluid form of Pepsine whatever.

May be prescribed with most substances compatible with acids. In 4oz., 8oz. and 16oz. bottles, and in bulk.

The published experiments of G. F. DOWDESWELL, Esq., B.A. Cantab., F.C.S., F.L.S., &c., Dr. PAVY, Professor TUSON, the late Professor GARROD, and others, conclusively demonstrate the marked superiority of BULLOCK'S PEPSINA PORCI AND ACID GLYCERINE OF PEPSINE over every other Pepsine or preparation of Pepsine—ENGLISH, FRENCH, GERMAN, OR AMERICAN.

*** *In prescribing either of the above preparations, it is suggested to insert in parenthesis as follows* (BULLOCK).

J. L. BULLOCK & CO., 3, Hanover Street, Hanover Square, LONDON, W.

ALLCHIN'S SMELLING SALTS, &c.

The increasing demand for these celebrated Smelling Salts has induced the Proprietor to bring them out in a more portable and elegant form than hitherto supplied. The New-shaped Bottles will be found well worth the attention of the Trade.

WHITE FLINT GLASS,	*Handsomely Cut, 3 Sizes, Retail*	1/6, 2/-, 2/6
,, ,, ,,	*Watch Shape, for the Pocket, 3 Sizes, Retail*	1/-, 1/6, 2/-
,, ,, ,,	*The New 6d., Retail*	6d.

ALFRED ALLCHIN'S PHARMACEUTICAL PREPARATIONS.

SMELLING SALTS.—The MONOCARBONATE OF AMMONIA, manufactured by ALFRED ALLCHIN, is the Neutral Salt so much valued for the preparation of Smelling Salts. It retains its pungency as long as any Salt remains. 1-lb. bottles, 2s. 8d. each.

LIQ. AMMON ODORIF., or VOLATILE ESS., for Allchin's Ammon. Monocarb. In stoppered Bottles, 4 oz., 1s. 8d.; 8 oz., 3s.; 16 oz., 6s. each.

PUNGENTS, with handsome Cut Stoppers, filled with Allchin's Smelling Salts, 8s. per doz.; retail, 1s.

OL. ROSÆ CONCENT.—One ounce of this Concentrated Solution of Anchusine, mixed with two pounds of Oil, will give it the usual colour; it is also admirably adapted for colouring Pomades, Lip Salve, Camphor Balls, &c. 4s. per lb.

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Sole Proprietors: **W. BUSH & Co. (late Allchin), Chemists, 180, Barnsbury Rd., London.**

TO BE HAD OF ALL THE WHOLESALE HOUSES.

Extractum Cinchonæ Liquidum.

Messrs. HOWARDS & SONS,

Referring to the recent papers on the above subject, desire to call attention to their

"Ext. Cinchon. Liq. H. & S., Calisaya,"

"Ext. Cinchon. Liq. H. & S., Succirubra,"

which are prepared from selected Cinchona without the use of mineral acids, contain the whole alkaloidal contents of the bark, are uniform in quality, and carefully standardized. Each preparation contains 48 grs. alkaloids per fluid ounce, the former representing fine *verde* Calisaya, and the latter good Succirubra.

Packed in 4, 8, or 16-oz. Bottles, or Bulk.

May be ordered through any Wholesale Houses. Prices for large quantities on application.

DR. MICHAELIS'
TONIC COCOA.

Made from pure Cocoa of the finest quality, combined with a soluble extract of acorns, and free from Cellulose.

Recommended expressly for Catarrhal Affections of the Digestive Organs, also for Chronic and Infantile Diarrhœa. A Tonic, Nutritious, and Digestive daily beverage for children and persons of all ages, and especially useful in convalesence and for persons suffering from debility.

"Has a pleasant flavour like chocolate, never palls upon the palate; rapidly improves the condition of the children in cases of diarrhœa and their state of nutrition. In extensive use in Germany as a beverage both for children and for adults."—*British Medical Journal*, July 31st, 1886.

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STOLLWERCK BROS.
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145, CANNON STREET, LONDON, E.C.

☞ *Samples for trial will be forwarded on application to Medical Men and Public Institutions.*

DISPENSING BOTTLES & PHIALS

We supply our celebrated 6 and 8 ounce Bottles at 8s. per gross. Name and address can be had on them if required, *no extra charge.* Also our white moulded Phials at very low prices. Send copy of order required, and get estimate from us before ordering of any other house.

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Established upwards of 50 years.

BY SPECIAL APPOINTMENT.

SPRATTS PATENT
MEAT 'FIBRINE' VEGETABLE DOG CAKES

BY SPECIAL APPOINTMENT.

(WITH BEETROOT).

DOG MEDICINES for the Cure of Distemper, Worms, Mange, Eczema, Ear Canker, Rheumatism, and the various other Canine Diseases. Full List and Pamphlet on Canine Diseases, post free.

"COMMON SENSE OF DOG DOCTORING," price 6d.

DOG SOAP, 6d. per Tablet.

LOCURIUM. Price 6d. and 2s. per Bottle, retail. A Patent Vegetable Oil, curing Sore Feet in Dogs, Cracked Heels, Broken Knees, or Sore Backs in Horses; and Sores, Bites, and Wounds of all kinds, either in man or beast.

Small Pamphlets on Canine Diseases supplied free for distribution.

WHOLESALE TERMS OF **SPRATTS PATENT LIMITED, LONDON, S.E.,** OR YOUR WHOLESALE HOUSES.

SPECIAL NOTICE & CAUTION

BRAND & CO.

The original Manufacturers of Essence of Beef (green label under wrapper), and other Specialities for Invalids, have

NOT REMOVED

From their SOLE ADDRESS, No. 11, LITTLE STANHOPE STREET, MAYFAIR, W., and caution the trade to

BEWARE OF IMITATIONS.

CHUBB'S BEST SEIDLITZ POWDERS

Full Weight—Howard's Materials, Loose, at **7s.** per gross, and in lift off boxes, **7s. 6d.** per dozen; hinged boxes, **8s. 6d.** per dozen.

CHUBB'S EXTRA SCENTED VIOLET POWDER

(WARRANTED PURE STARCH POWDER),
In 1*d.* Boxes, **6s.** gross, and 2*d.* Boxes, **11s.** gross, and in ¼-lb. and ½-lb. Packets, **10d.** per lb.

CHUBB'S PREPARED FULLER'S EARTH

In 1*d.* Boxes, **5s.** gross, and 2*d.* Boxes, **9s.** gross, and in ROUND Boxes, 3*d.* size, **1s. 6d.** per dozen, 6*d.* size, **2s. 6d.** per dozen.
SUBJECT TO 15 °/₀ DISCOUNT FOR CASH.

May be obtained through all the Wholesale Houses, or direct from

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SPECIAL QUOTATIONS FOR LARGE QUANTITIES.

GELATINE COATED OVAL PILLS

We are now preparing the above, which are **the only Oval Gelatine Coated Pills of English Manufacture** in the market. We are also issuing a **Special List**, which will be supplied on application.

The distinctive colours of the ingredients contained within them show through the transparent coating; and our Pills are admirably adapted for the **elegant administration of single drugs**, as well as compound pill masses. Thus, **our Quinine** ($\frac{1}{2}$ gr., 1 gr., and 2 grs.) **Pills are perfectly white, soluble, and tasteless.** We also put up **Aloin, Camphor. Monobrom, Cerii Oxalas, Pepsin,** etc., as well as smaller Pills of **Morphia, Acid Arsenios, Picrotoxia, &c.**

WYLEYS & CO. { Wholesale and Export Druggists and Manufacturing Pharmaceutists, } **COVENTRY**

And WYLEYS & CO., 1a, BURY STREET, ST. MARY AXE, LONDON, E.C.

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BARRON, SQUIRE & Co.

(LATE DREW, BARRON & CO.)

WHOLESALE & EXPORT DRUGGISTS,

BUSH LANE, LONDON, E.C.

Telegraphic Address: "NORRAB, LONDON."

Manufacturers of all descriptions of Pharmaceutical Preparations,

Beg to inform Merchants, Shippers, &c., that all Indents entrusted to them will receive careful attention and prompt execution.

Messrs. B., S. & Co. request the attention of their friends and the Trade, at home and abroad, to their having PURCHASED THE BUSINESS of Messrs. JAMES BASS & SONS, Hatton Garden, and with it the various formulæ from which their Special Preparations have been made, and pledge themselves to supply them in all their integrity.

Specimens of these Preparations have remained in the Museum of Kew Gardens during 23 years without deterioration.

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AYRTON & SAUNDERS, Manufacturers of Superior WILLOW BOXES, have had many complaints from Chemists and Druggists throughout the country as to the difficulty of procuring, from the usual Wholesale Houses, their English-made **WILLOW BOXES**, and consequently are obliged to use those of foreign make, which usually are of an inferior, weak and fragile description, with insides full of sharp splinters, and tops and bottoms falling easily away, subjecting users to great annoyance and vexation. To remove this difficulty A. & S. are prepared to execute promptly any orders for their Goods direct from the Manufactory, and to facilitate business will forward, on receipt of six stamps to defray postage, a complete Set of Samples (18), each box marked with its proper size and description.

Prices and Discount forwarded with Samples.

Manufactory and Warehouses:—

149 & 153, DUKE STREET, & 62, PARR STREET, LIVERPOOL.

OVOID CAPSULED PILLS.

(Of the British Pharmacopœia and other Standard Authorities.)

ORIGINATED 1870 BY **McKESSON & ROBBINS,** NEW YORK, U.S.A.

LONDON AGENCY—S. MAW, SON & THOMPSON, 7 to 12, Aldersgate Street, E.C.

Can be had of Messrs. **BURROUGHS, WELLCOME & CO.,** Snow Hill Buildings, London, E.C.

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And the Principal Wholesale Houses in the Trade throughout Great Britain and Ireland at the same terms.

"McK. & R." PILLS.

		DOZ. BOTTLES conting. 25 Pills	DOZ. BOTTLES conting. 100 Pls.
Aconitine Crystals (Duquesnel's)	1-500 gr.	7s. 0d.	24s. 0d.
,, ,, ,,	1-200 gr.	7 0	24 0
Aloes Barb. B.P.	5 gr.	5 0	16 0
,, Dilute (Hall's Dinner)		5 0	16 0
,, Socotrine, B.P.	5 gr.	5 0	16 0
,, and Asafœtida, B.P.	5 gr.	5 0	16 0
,, and Iron, B.P.	5 gr.	5 0	16 0
,, and Myrrh, B.P.	3 gr.	5 6	18 0
,, ,, ,,	5 gr.	6 0	20 0
,, Nux Vomica		6 0	20 0
Aloin	1-10 gr.	5 0	16 0
,,	1-4 gr.	6 0	20 0
,,	1-2 gr.	7 0	24 0
,,	1 gr.	11 0	39 6
,, Compound		7 0	24 0
,, and Strychnine		7 0	24 0
,, Strychnine and Belladonna		7 0	24 0
Anti-Cholera	2 gr.	7 0	24 0
Anti-Dyspepsia (Fothergill's)		7 0	24 0
Aphrodisiac		16 0	59 6
Arsenious Acid	1-50 gr.	5 0	16 0
,, ,,	1-20 gr.	5 0	16 0
Asafœtida, U.S.		5 0	16 0
,, Compound, B.P.	5 gr.	5 0	16 0
Atropine	1-300 gr.	7 0	24 0
,,	1-100 gr.	7 0	24 0
Blue Mass, B.P.	1 gr.	5 0	16 0
,, ,,	2 gr.	5 0	16 0
,, ,,	3 gr	5 0	16 0
,, ,,	5 gr.	5 6	18 0
,, ,, Colocynth and Hyoscy		9 0	32 0
Calcium Sulphide	1-10 gr.	6 0	20 0
,, ,,	1-4 gr.	6 0	20 0
,, ,,	1-2 gr.	6 0	20 0
,, ,,	1 gr.	6 0	20 0
Calomel, Colocynth, and Hyoscyamus		9 0	32 0
,, Comp. B.P.	5 gr.	5 6	18 0
,, and Opium		7 6	26 0
Camphor and Hyoscyamus		5 6	18 0
,, Mono-Bromated	2 gr.	11 0	39 6
Cannabis Indica Extract	1-4 gr.	7 0	24 0
,, ,, ,,	1-2 gr.	9 0	32 0
Cascara Sagrada Extract	3 gr.	7 0	24 0
Cathartic Compound U.S.P.		5 6	18 0
Codeine	1-2 gr.	20 6	79 0
Colocynth Comp. B.P.	4 gr.	8 0	28 0
,, ,, ,,	5 gr.	9 0	32 0
,, ,, and Blue Mass	5 gr.	9 0	32 0
,, ,, and Calomel	5 gr.	9 0	32 0
,, ,, and Hyoscy, B.P.	5 gr.	9 0	32 0
,, ,, Extract, B.P.	5 gr.	9 0	32 0
Conium Compound, B.P.	5 gr.	5 0	16 0
Copaiba Compound		5 6	18 0
,, and Oloe-Resin Cubeb	5 gr.	11 0	39 6
Corrosive Sublimate	1-30 gr.	5 0	16 0
,, ,,	1-20 gr.	5 0	16 0
,, ,,	1-10 gr.	5 0	16 0
Croton Chloral	1 gr.	10 0	36 0
,, ,,	2 gr.	17 0	63 6
Cubeb, Oleo Resin, with Soda		7 0	24 0
Digitalin	1-60 gr.	7 0	24 0
Elaterine	1-20 gr.	13 0	47 6
Emmenagogue (Mutter's)		5 6	18 0
Ergotin	3 gr.	16 6	63 0
Euonymin	2 gr.	16 0	59 0
,,	3 gr.	20 6	79 0
,, Compound		16 0	59 0
Ferruginous (Blaud's)	3 gr.	6 0	20 0
,, ,,	5 gr.	7 0	24 0

		DOZ. BOTTLES conting 25 Pills	DOZ. BOTTLES conting. 100 Pls.
Hydrastine (White Alkaloid)	1-2 gr.	20 6	79s. 0d.
Iodoform	1 gr.	9 0	32 0
,, and Iron		11 0	39 6
Ipecac. Powdered	1-4 gr.	5 0	16 6
,, ,,	5 gr.	5 0	16 0
,, Comp. (Ipecac. and Opium)	5 gr.	9 0	32 0
,, and Squill, B.P.	5 gr.	5 0	16 0
Iron Arseniate	1-8 gr.	5 6	18 0
,, Carbonate, B.P.	5 gr.	5 6	18 0
,, by Hydrogen (Quevenne's)	1 gr.	5 0	16 0
,, Iodide (Blancard's Formula)	1 gr.	7 0	24 0
,, and Quinine Citrate	2 gr.	10 0	35 6
,, Quinine, and Strychnine		13 6	49 6
Laxative Vegetable (Improved Cath.)		5 6	18 0
Manganese, Bin-oxide	2-gr.	9 0	32 0
Mercury, Bin-Iodide	1-16 gr.	5 0	16 0
,, Proto-Iodide	1-8 gr.	5 0	16 0
,, ,,	1-4 gr.	5 0	16 0
Morphine, Muriate	1-8 gr.	7 0	24 0
,, ,,	1-4 gr.	9 0	32 0
Narcotic Extracts (Brown-Sequard)		15 0	55 6
Nitro-Glycerin	1-100 gr.	7 0	24 0
,,	1-50 gr.	7 0	24 0
Opium, Powdered	1 gr.	7 0	24 0
,, and Acetate of Lead, B.P.	5 gr.	7 0	24 0
,, and Camphor		7 0	24 0
Pepsin, Pure Concentrated	1 gr.	9 0	32 0
Phosphorus	1-000 gr.	6 0	20 0
,,	1-50 gr.	6 0	20 0
,,	1-30 gr.	6 0	20 0
,, and Iron		8 0	28 0
,, Iron and Quinine		17 0	63 6
,, and Nux Vomica		7 0	24 0
,, Nux Vomica and Iron		8 0	28 0
,, and Quinine		17 0	63 6
,, Quinine, Iron, & Strychnine		17 0	63 6
,, and Valer. Zinc		11 0	39 6
Picrotoxin	1-80 gr.	7 0	24 0
Podophyllin	1-8 gr.	5 0	16 0
,,	1-4 gr.	5 0	16 0
,,	1-2 gr.	5 6	18 0
,, Comp.		8 0	28 0
Quinine, Bi-Sulphate	1-4 gr.	5 0	16 0
,, ,,	1-2 gr.	5 0	16 0
,, ,,	1 gr.	5 0	16 0
,, ,,	2 gr.	7 6	26 0
,, ,,	3 gr.	10 6	38 0
,, ,,	4 gr.	13 0	48 0
,, ,,	5 gr.	16 0	60 0
,, Sulphate	1-4 gr.	5 0	16 0
,, ,,	1-2 gr.	5 0	16 0
,, ,,	1 gr.	5 6	18 0
,, ,,	2 gr.	8 0	28 0
,, ,	3 gr.	11 0	40 0
,, ,,	4 gr.	14 0	52 0
,, ,,	5 gr.	17 0	64 0
,, Comp. (Anti-malarial)		15 0	55 6
Rhubarb Comp., B.P.	5 gr.	7 0	24 0
,, ,, and Blue Mass	5 gr.	7 0	24 0
Rhubarb, Ipecac. and Soda		7 0	24 0
Salicylic Acid	2 gr.	7 0	24 0
,, ,,	5 gr.	11 0	39 6
,, Comp.		16 6	63 0
Soap Comp., B.P.	5 gr.	8 0	29 0
Squill Comp., B.P.	5 gr.	5 6	18 0
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THE CHEMISTRY OF THE ANCIENT EGYPTIANS.

The chemistry of the ancients is known to us principally through some articles upon materia medica, mineralogy and metallurgy by Theophrastus, Dioscorides, Vitruvius and Pliny the elder. The only amplification of this information hitherto afforded has been yielded by the analysis of trinkets, pigments, enamels and vitrified and ceramic products found in the débris of ancient civilizations. Egypt, in particular, though associated by tradition with the origin of alchemy, and reputed also to have been the source of much of the learning of the later alchemists, had not until recently contributed any genuinely ancient hieroglyphic writing relative to the mysterious operations by which it was pretended that the transmutation of matter was effected. The publication therefore, at Leyden, of the text of some authentic papyrus documents, dating back to the third and fourth centuries of the Christian era, and containing, among other information, a number of chemical, alchemical, and metallurgical receipts, is an event of considerable interest. Not only has the text of these documents been published, but the portion specially interesting to modern chemists has been made the subject of an exhaustive commentary, from the competent pen of M. Berthelot, which appeared in the September number of the *Annales de Chimie et de Physique*.

The documents referred to are three in number, and are distinguished as Papyrus V., Papyrus W., and Papyrus X. They appear to have been preserved at Thebes, probably in a tomb, or more exactly in a mummy, and in the opinion of M. Berthelot they constituted the notes of a dishonest metal worker and charlatan magician. Papyrus X. is devoted to receipts more or less connected with chemistry and alchemy, of which there are 101, followed by 10 articles extracted from Dioscorides. The papyrus is believed to have been written as far back as the latter part of the third century, and is probably similar to those old Egyptian alchemical books upon gold and silver, which were burnt by Diocletian about the year 290, in order that the Alexandrians should not profit by this art and draw from it the wealth that would enable them to revolt against the Romans. The systematic destruction of such documents is attested by Procopius and other Byzantine historians, and was in conformity with the practice under the Roman law in respect to books on magic, which led to the loss of many scientific works.

The information contained in the escaped papyruses closely resembles that given by Dioscorides and Pliny upon the mineralogy and metallurgy of the ancients, so that many of the receipts probably reach back at least to the commencement of the Christian era, and as technical processes are frequently transmitted from one generation to another, it may be that some are much older. What is equally interesting is that M. Berthelot believes these ancient documents furnish evidence that the hopes and doctrines of the alchemist relative to the transmutation of metals were born of the practices of Egyptian goldsmiths in imitating and debasing the precious metals. Commencing with fraudulent practices with the intent to deceive others they appear to have succeeded so well as eventually to have fallen under the illusion that with the aid of some mysterious rite their debased alloys actually were converted into the metals which at first they were only intended to simulate. However this may be, it is pretty clear that the artisan who compiled these receipts was under no such delusion, and that in attaining his ends he in many cases followed processes that had more than a passing resemblance to those still adopted for similar purposes several centuries later. The receipts and the detailed commentary upon them by M. Berthelot are far too lengthy for quotation in their entirety, but the instances mentioned in the following paragraphs will give some idea as to their nature.

Papyrus V.—This papyrus is devoted principally to magic formulæ, but among them is one for a writing ink. It consists of "misy" (basic sulphate of iron mixed with sulphate of copper), 4 drachms; green copperas, 2 drachms; gall nuts, 2 drachms; gum, 3 drachms. To these is to be added 4 drachms of a "mystic ink," manufactured in an unspecified way from "the seven perfumes and the seven flowers" that appear to have been specially associated with magic formulæ. From Papyrus W. it appears that the "seven perfumes" were styrax, consecrated to Saturn; "malabathrum," to Jupiter; costus to Mars; olibanum, to the Sun; Indian nard (rhizome of *Nardostachys Jatamansi*), to Venus; cassia to Hermes; and myrrh to the Moon. The "seven flowers," according to Manetho, quoted in the same papyrus, were the common marjorum, lily, lotus, "eriphyllium," narcissus, white violet and rose. These were to be brayed together in a white mortar twenty-one days before the ceremony in which they were to be used and then dried in the shade.

In this papyrus there is also a receipt for the refining of gold, which was a process of cementation, and consisted essentially in roasting the gold with salt and ferruginous sulphate of copper. Pliny* gives a similar receipt, but adds that the ash was used as a medicinal remedy. This ash would apparently have consisted mainly of chlorides and oxychlorides of the foreign metals, and M. Berthelot thinks it may possibly have contained a minute quantity of a gold salt in the form of a double chloride.

Papyrus W. contains exclusively formulæ relating to magic, but it presents one point of interest in the use of words that may be rendered "tetragonal nitre," as the designation of a material used for writing on with the magic ink before referred to. Neither saltpetre nor sodium carbonate would answer to this requirement, and M. Berthelot is of opinion that the designation was applied to some moderately hard insoluble substance, such as calc-spar or felspar.

Papyrus X. is more specially chemical and metallurgical. It bears witness to a very advanced and subtle knowledge of alloys and metallic colourings, which found its application not only in legitimate ways, but also in the fraudulent debasement of gold and silver. Many of the practices described in this papyrus are identical with those of the older alchemists, though free from the mystic trappings of the latter, a fact which has an important bearing on the origin of alchemy. The papyrus consists of ten large leaves, about 12 inches by 14, folded in two; there are sixteen pages

* 'Hist. Nat.,' l. xxxiii., 25.

of writing, varying from twenty-eight to forty-seven lines, written in the Greek capitals of the latter part of the third century. It contains altogether 111 receipts of different dates, many of them being more or less repetitions, huddled together without any attempt at arrangement, and frequently disfigured by stupidities and orthographical and other grammatical faults. It bears the stamp of great genuineness, being without a shadow of charlatanism, notwithstanding the professional dishonesty of many of the receipts, and appears to have been the working note-book of an artisan in the precious metals, who also perhaps practised a little dyeing of the more valuable stuffs.

In the first place there are no less than fifteen receipts for inks for writing in gold, showing that there was a close connection between the calling of the worker in precious metals and that of the hierogrammate, or sacred scribe, whose business it was to trace characters in gold or silver on monuments of marble or other stone as well as in books of papyrus or parchment. In fact the receipts given in this papyrus for the gilding of metal work are many of them the same as those for writing in gold. They show that in the third century, as now, the name "gold" was loosely applied not only to the pure metal, but to alloys of all degrees and even to mixtures that had nothing in common with gold but the colour. Thus the "gold" inks include gold leaf triturated with honey and gum ; gold amalgam with and without gum ; alloy of gold and lead variously treated ; yellow oxide of lead mixed with alum and suspended in dove's dung and vinegar ; mixtures having orpiment for their basis ; copper made to resemble gold by washing with an infusion of "cumin ;" and carthamus florets and tortoise or calf's gall. Even an ink of "asem," an alloy of silver and gold, had its imitation in one of copperas, sulphur and vinegar, from which both the precious metals were therefore absent.

Closely allied to the foregoing are receipts for gilding, silvering, tinting and colouring metals superficially. Two of these describe a treatment of steeping that would appear to have had for its object the removal of base metal from the surface of an article made from an alloy, so that the exposed parts might consist only of gold, and there are others designed to effect the same object by a process of cementation. Then there are some processes of actual gilding, one of which is remarkable for the absence of mercury, a circumstance that, in M. Berthelot's opinion, may indicate that it had its origin before mercury was known, although a knowledge of that metal reaches back to at least five centuries before the Christian era. The process consists in coating the article, such as a ring, with a paste made by incorporating with gum a mixture of gold and lead, submitting the article to heat and repeating the operation until the result is satisfactory. The treatment is then, the receipt goes on to say, difficult of detection, as the heat consumes the lead, but not the gold. In fact it is to be feared that deception was the order of that day in the metal craft, the reader being assured in another case of silver gilded by means of gold leaf and mercury that the article will stand the ordinary test for gold. Other receipts are avowedly only intended to give the appearance of gold, among which may be mentioned one containing realgar, cinnabar and "misy" (basic sulphate of copper and iron). A gold varnish for application to metal objects after they had been passed through the fire consisted of lamellous arsenic, copperas, a sulphide of arsenic, mercury, tragacanth and arum pith in equal parts suspended in goat's gall. The agents for "silvering" copper that are mentioned include mercury, an amalgam of tin, and a process in which the whitening of the metal was effected by means of arsenic.

One name that appears repeatedly in the receipts is "asem," which has been identified as having been originally a synonym of "electrum," a designation applied to an alloy of gold and silver that occurs in nature. This alloy was long regarded as a distinct metal, comparable to gold or silver, and it is referred to side by side with them upon the Egyptian monuments. It was consecrated to Jupiter, but this place was afterwards filled by tin, probably when the true nature of asem became better understood. Meanwhile its apparent behaviour evidently gave rise to a deal of mystification. It differed considerably in the proportion of gold and silver it contained, and seemed therefore to vary in its properties ; but probably what brought it most reverence was the fact that according as it was treated it seemed to be convertible into gold or silver. It is easy to see how this favoured the belief in the possibility of the transmutation of metals. In fact, native asem, and afterwards an artificially produced alloy of gold and silver, evidently played an important part in the "diplosis" of gold, which was the euphonious term applied to the increasing of its bulk by the introduction of less valuable metal. It may be that at first this process was hardly open to the charge of being wilfully fraudulent ; for M. Berthelot thinks he can detect evidence that "asem" was looked upon as a kind of metallic ferment, and it is curious to note that nearly all the receipts for the artificial manufacture of asem provide for the introduction of a piece from a previous making, just as a piece of "sour dough" is used to start a fresh fermentation in bread making. But however this may be, the "diplosing" material was, at the time these receipts were collected, evidently not only itself subjected to "diplosis," but to the worse fate of entire substitution. By that time the name covered a large variety of compounds, and among the receipts for asem given are some for alloys of silver and tin, silver and lead, silver, tin and copper, and other alloys and amalgams into which neither gold nor silver enter as an ingredient. There is one consisting of silver, tin and copper, that is recommended as yielding an asem preferable to the real article. There are also receipts for making black asem, which seems to have been comparable to what is known as oxidized silver.

One more article that is the subject of a receipt is worthy of mention, and that is ὕδωρ θεῖον, sulphur water or *eau divine*. This preparation was credited with very wonderful properties by the alchemists, who played continually upon the double meaning of the name. It was also called by them "serpents' gall." In this papyrus it is ordered to be prepared by heating a handful of lime and a handful of sulphur, in fine powder, together with strong vinegar or the urine of a child, until the supernatant liquor appears like blood, and then decanting the liquor from the sediment. In this way a solution of polysulphide of calcium would be obtained that could be turned to many purposes by the metal worker and chemist.

THE USE OF MAGNESIA IN MAKING SOLUTIONS OF ESSENTIAL OILS.*

BY E. B. SHUTTLEWORTH.

Whatever doubt there may be as to the propriety of the practice, the fact remains that the use of certain absorbent powders, for promoting the solubility of essential oils and kindred substances, is very general with pharmacists and others engaged in like manipulations. This expedient has received the sanction of numerous authorities, including some of the pharmacopœias, and though the use of magnesium carbonate for the preparation of medicated waters has been discarded by the U.S.P. on the ground of the solubility of the salt in an aqueous menstruum, recourse is now had to cotton wool, which produces results very similar in character.

The manufacture of soluble essences, as that of ginger, gave a fresh stimulus to solution by intervention, and also brought closer the conclusion to which it is the object of the writer to direct attention. The experiments of Thresh, Sheppard, Creuse and others, clearly show that though by the use of absorbent substances it is possible to produce a clear and miscible essence, it is always at the expense of some of the flavouring or odorous principle.

The substances which have been employed for the purpose indicated are magnesium carbonate and oxide; calcium phosphate, hydrate and sulphate; talc, fullers' earth, pumice, charcoal, paper pulp, and cotton wool. Solutions of potassium hydrate and carbonate, the latter in the form of oil of tartar, have also been recommended, more especially for the preparation of soluble essences.

The action of the alkaline compounds is not to be attributed to the same causes as that of chemically inert substances, while magnesium carbonate partakes of the character of both classes. Its formula,

$$(MgCO_3)_3Mg(HO)_24H_2O,$$

indicates the presence of 20·4 per cent. of hydrate, which plays the part of an alkali, and like other substances of the same character forms saponifiable compounds with the resins which are associated with many volatile oils.

This cannot be said of such substances as calcium phosphate, pumice, cotton wool, charcoal, etc. These agents act mechanically by surface attraction, which is of course a form of adhesion. If any of these be agitated with a solution of colouring matter the whole or part of the latter will disappear, not because it is rendered soluble in a colourless condition, but that it has been simply withdrawn from the solution and attached to the solid substance. In other words, the force of adhesion between the colouring matter and the solid is stronger than that between the colouring matter and the liquid, and the latter has to give way. In the case of essential oils and alcoholic or hydro-alcoholic menstrua the case is precisely similar. If an attempt be made to dissolve a quantity, say 8 ounces, of a volatile oil, as that of lemon, in a mixture of half a gallon each of alcohol and water, a milky mixture will result, and a quantity of oil will in time separate, but if the oil is previously triturated with magnesium carbonate and then mixed with the solvent and filtered, a clear essence will be produced. The reason is simply that the carbonate has absorbed and retained about half the original quantity of oil. This will not be any news to those who ask the why and wherefore of results, but there are doubtless many to whom the fact is not known. That the oil really adheres to the carbonate may be readily shown by mixing the pasty mass with cold water, when the bond of adhesion will be broken by the force of gravity, and the lighter oil will be forced to the surface; or, better still, if the attraction be overcome by heat and the oil separated by distillation. Another, and perhaps the simplest and most effectual means of separation is to match the force of chemical attraction against that of adhesion. A little dilute sulphuric acid may be added to the contents of the filter, previously mixed with a little water, when the union between magnesia and acid will be complete, and the whole of the displaced oil may be recovered and estimated. In most cases it will be found that in physica properties at least it is precisely similar to the oil originally used.

That much ignorance or thoughtlessness exists on this point is evident from the wide extent of the practice. The amount of money annually lost, directly, from this cause must be very considerable, and the trouble incurred in trituration and filtration makes the loss even greater. In the case of cologne, lavender water, and other perfumes, it is always considered good form to reduce the quantity of spirit to a minimum, as a more permanent and less costly product is thought to be thus secured. If this is sought by the use of magnesium carbonate, or other intervening substance, the object will always be purchased at the expense of the preparation. Even filtration through simple paper is attended with some loss of oil, and the only safe plan to pursue where aqueous dilution is desirable, and the precise solubility of the oils is unknown, is to make a clear solution with strong spirit, adding water gradually, and with much agitation, until opalescence is produced, and then after the lapse of a little time adding a quantity of spirit sufficient to restore transparency.

In some cases certain oils contain resinous constituents which may be removed by alkaline substances, as magnesium carbonate; or a soluble essence may be desired, no matter at what expense. It will be worth while for those engaged in manipulation with such compounds to experiment with ordinary milk, as in the defuselization of spirit.

* From the *Canadian Pharmaceutical Journal*, Nov.

NOTES ON A FEW CHEMICAL SUBSTANCES RECENTLY INTRODUCED INTO THE FIELD OF CHEMICAL INDUSTRY.*

BY IVAN LEVINSTEIN.

One of the principal objects of our Society is that of keeping its members posted up in the progress which is being made, not only in scientific, but more especially in industrial chemistry. With this object in view I desire to direct your attention to the following chemical compounds—viz., salol, lanolin, and antifebrin, which have lately become of industrial and also of medicinal importance.

Commencing with salol—the new antirheumatic *par excellence*—I may just state that I am aware that attention has already been called to it by Mr. Moss, in a paper read before the British Pharmaceutical Conference, held on September 1; that gentleman was, however, under the erroneous impression that the process of its manufacture was a secret, and was not aware that it was the subject of a patent; and this fact will serve as a justification for further referring to this very interesting and valuable substance.

Salol was produced about three years ago by Professor Nencki, who also investigated its physiological properties. To Dr. H. Sahli, however, is due the credit of having first practically applied it to medicinal purposes; and the results which he obtained were made public by him in the early part of the present year, in a communication to the Société de Médicine et de Pharmacie, at Berne. Nencki and von Heyden's successors patented the process of the industrial manufacture of salol in Germany, England, and other countries about three or four months ago, and transferred the right of manufacture to three continental firms—viz., Messrs. Durand and Huguenin, of Basel; Dr. von Heyden's successors, of Dresden; and E. Schering, of Berlin. The complete specification of the British patent, No. 8018, 1886, has not been filed, and no copy of it is obtainable, while the German specifi-

* Read before the Manchester Section of the Society of Chemical Industry.

cation has not yet been printed. According to the inventors, there are within their knowledge three modes of practically effecting the industrial production of salol—viz.,

1. Heating salicylic acid and phenol or naphthol with phosphorus pentachloride or phosphorus oxychloride.

2. Melting the sodium or other metallic compounds of the salicylic acid and phenol or naphthol together, with phosphorus pentachloride or phosphorus oxychloride.

3. Treating with phosphorus pentachloride or phosphorus oxychloride the crude product of the reaction obtained in the manufacture of salicylic acid.

This last mode is probably the most likely to produce the most economical results. The general reaction may be stated to be as follows :—

When fatty or aromatic acids are heated with phenol or naphthol in presence of a dehydrating agent, such for instance as phosphorus oxychloride, acid ethers are formed. Thus, if molecular quantities of salicylic acid and phenol are melted together, and this mass heated with phosphorus oxychloride, at from 120° to 130° C., the salicylic phenol ether or phenol salicylate, "salol," $HO.C_6H_4CO.OC_6H_5$, is obtained.

$$2(HO.C_6H_4CO.OH) + 2(C_6H_5.OH) + POCl_3 = 2(HO.C_6H_4CO.OC_6H_5) + HPO_3 + 3HCl.$$

Salicylphenylether (salol).

Under the same conditions the resorcinol salicylic ether may be obtained, if the phenol is replaced by resorcinol.

The reaction is effected in a simpler manner, and gives a better yield if in place of free salicylic acid and phenol their sodium or other metallic salts are used, as the following equation will explain :—

$$2(HO.C_6H_4CO.ONa) + 2(C_6H_5.OH) + POCl_3 =$$
$$2(HO.C_6H_4CO.OC_6H_5) + NaPO_3 + NaCl + 2HCl, \text{ or}$$
$$2(HO.C_6H_4CO.ONa) + 2(C_6H_5.ONa) + POCl_3 =$$
$$2(HO.C_6H_4CO.ONa) + NaPO_3 + 3(NaCl).$$

Instead of phosphorus oxychloride, phosphorus pentachloride may be substituted.

In place, however, of commencing with free salicylic acid, the salicylphenolether (salol) may be produced by taking the crude product of reaction, as obtained in the process of manufacturing salicylic acid according to the following formula :—

$$2(C_6H_5.ONa) + CO_2 =$$
$$NaO.C_6H_4CO.ONa + C_6H_5OH.$$

This mixture, after being allowed to cool, is treated either with phosphorus oxychloride or phosphorus pentachloride, when the process may be explained by the following equation :—

$$4(C_6H_5.ONa) + 2(CO_2) + POCl_3 =$$
$$2(HO.C_6H_4CO.OC_6H_5) + NaPO_3 + 3(NaCl).$$

Finally, the process may be effected by first heating for some time in closed vessels a mixture of phenol carbonate, sodium hydrate, and phenol at 180° to 200°, allowing it to cool a little, and then treating the mass as above described with phosphorus oxychloride or phosphorus pentachloride.

The information available with regard to salol is naturally scanty, as the article itself is comparatively of recent origin, and its manufacture was only commenced within the last few months. All that has been published is more or less an abstract of the communication of Dr. Sahli, who, however, chiefly confined himself to its therapeutic properties. Dr. Sahli's experiments thus far go to prove that salol is a valuable antiseptic, antipyretic and antirheumatic. He especially remarks on its great efficacy in rheumatism, and on this point I can confirm his far greater experience by a single instance which happened to fall under my personal observation. A friend had been suffering for a lengthened period, extending over several years, from chronic rheumatism of the joints; and after having spent more than three months of the present year at the best anti-rheumatic watering places on the Continent, returned without having derived the benefit desired. On the contrary, the pains increased, and also the swelling of the knee and finger joints. Having read Dr. Sahli's paper, I induced my friend to try salol, and its beneficial effect on him has certainly been most striking. In the course of a few days the pains were relieved, and the swellings subsided immediately. My friend then discontinued the use of the salol, but was again inconvenienced by the damp and wet weather of the early portion of last month; he again took the salol with equally satisfactory results, and though it has not yet entirely removed his chronic rheumatism of old standing, he is at least in the fortunate position of possessing a remedy which will afford almost immediate relief from pain, and at once reduce the swelling of the joints. The possession of such a remedy is undoubtedly a great boon in this damp climate, so unfavourable for the cure of rheumatism. I may add that my friend had repeatedly tried salicylic acid, but had in every case been compelled to discontinue its use owing to the disturbance of the digestive functions which this remedy unfortunately produces with most persons. Now salol is practically free from this very great disadvantage, and under ordinary circumstances may be taken for weeks twice or thrice daily in doses of thirty grains, without producing any perceptible effect on the digestive organs. As Professor Nencki has shown, salol, being insoluble, passes unaltered through the stomach, and is only decomposed into salicylic acid and phenol in the duodendum by the ferments of the pancreas. Its action on the human system is, therefore, like that of salicylic acid and phenol combined, with this remarkable difference, that the latter may be taken in the form of salol without ill effects in larger doses than would be possible if taken alone. Salol is also said to be very effective in neuralgic and other similar complaints. After taking salol, the urine has a similar dark or even black colour to that of carbol urine, but it is singular that this dark colour is not present in all cases, even though comparatively large doses of salol are taken. Sahli attributes the valuable antipyretic properties of salol to some extent to the phenol which it contains, and thinks that this fact also accounts for its action as an antirheumatic being more powerful than that of salicylic acid. Salol is further recommended as an immediate and very efficient antiseptic, and for surgical operations it may be found of the highest value, as it is neither caustic nor irritating, like phenol and salicylic acid. Dr. Sahli also employs salol as a dentifrice, and considers it to be, perhaps, the only one that will effectually prevent the spread of caries in the teeth. He dissolves salol in alcohol, and adding a small quantity of this solution to water, uses the milky emulsion for rinsing the mouth. His theory is that small particles of the insoluble salol in this finely divided state become lodged in the small crevices of the teeth, and thus act for a certain length of time as an antiseptic. Chemically as well as physically, salol behaves in a similar manner to fats; it is soluble in ether, alcohol and petroleum spirit; crystallizes in large and well-developed crystals, and possesses a not disagreeable aromatic smell. Its melting-point is 43° C. The fact of its possessing similar properties to fats, and its solubility in petroleum and other solvents, renders it very suitable for impregnating bandages or preparing salol-wool, as it adheres far more readily than salicylic acid.

I think enough has been said to show that this interesting substance may be destined to play an important part in medicine, in hygiene, and probably in the arts and manufactures. I have to thank Messrs. Durand and Huguenin for the specimen of salol which you have seen this evening, and which represents their commercial and absolutely chemically pure product.

We will now turn our attention to the next chemical substance which will occupy a portion of these fragmentary notes—viz., lanolin.

Cholesterin or Lanolin.

Cholesterin, $C_{26}H_{44}O + H_2O$, although in a strict sense chemically differing from fats, possesses very similar physical properties. It is present not only in the animal organism but also in the vegetable kingdom. Liebreich has recently demonstrated its presence in the human epidermis, in hair, whalebone, tortoiseshell, hornshavings, feathers of geese, fowls, turkeys and pigeons, bristles of the hedgehog, hoofs and warty excrescences on the leg of the horse, horny substance of the sheep's foot, etc. Until a short time ago, however, the usual material for obtaining cholesterin for scientific purposes was furnished by gall-stones, which consist principally of cholesterin, although many years ago F. Hartmann and E. Schulze had already found that the fat of greasy wool (wool-grease) contained cholesterin. Indeed, as far back as 1872, Schulze described a method of obtaining cholesterin from wool-grease. He heated the latter for about twenty hours in a closed vessel with alcoholic potash lye at 100° C., and on drawing off and evaporating the clear hot solution, mixing the residue with water and treating it with ether, he obtained two separate layers,—the watery layer, containing the fatty acids of the wool-grease as potash soaps, and the ethereal layer, holding in solution cholesterin, which, after evaporation was obtained pure by repeated crystallization of an ether-alcohol solution.

Cholesterin crystallizes in thin monoclinic tablets; it has a neutral reaction, being neither alkaline nor acid; it is free from smell and tasteless, insoluble in water, sparingly soluble in cold, but easily soluble in hot alcohol, ether, and chloroform; dissolves also readily in fatty acids; its melting-point is 145° C., and its specific gravity 1·067.

Professor Liebreich observed that cholesterin fat possesses the peculiar property of being able to absorb more than one hundred per cent. of water, and this singular property was denominated by the great pharmacologist lanosation, while the cholesterin mixed with water was termed by him lanolin. He also first called attention to the great therapeutic value of lanolin, and shortly afterwards the industrial production of pure lanolin was commenced by a Berlin firm,* and its manufacture has been of late steadily increasing, which is not surprising when we consider the valuable properties possessed by this substance. Indeed, it is impossible to foresee the manifold applications which it may yet find in medicine, arts and manufactures. Lanolin is already taking the place of vaselin, paraffin and lard, and there is every probability that before long it will exclusively replace these substances for medical purposes. Its efficiency in the composition of plasters, salves and ointments has already been established beyond doubt, and its superiority is due to the extraordinary readiness with which it is absorbed by the skin. While vaselin, for instance, directly hinders the passage of medicaments into the skin,—so that even some poisonous substances mixed with vaselin and rubbed into the skin produce neither local nor general symptoms of poisoning,—on the other hand, lanolin is absorbed by the skin with the greatest ease, and this ready absorption is not known to belong in a similar degree to any other fatty substance. So marked is the power of penetrating the epidermis possessed by lanolin that, according to Dr. W. G. Smith, when mixed with poisonous drugs, such as the toxic alkaloids, only about half the usual proportions should be prescribed in ointments. In attempting to account for the ready passage of the lanolin into the skin, Liebreich thought this property might probably be due to the fact of its originating from keratinous tissue. Lanolin may also be advantageously used in place of vaselin in *massage*. It is not so smooth as vaselin, but it possesses this advantage, that the skin, after being rubbed dry with a cloth, still remains soft and pliant; it is further recommended in cases where the epidermis is broken, as, for instance, in chapped hands, and is said to be very serviceable in the treatment of dandriff or scurf. Liebreich, however, warns us against many substances sold under the name of pure wool-oil or wool-grease, which have found their way into trade both before and since the introduction of lanolin. He considers these injurious, as they contain free acids and various other irritating substances.

Besides the medical uses which have been found for lanolin during the short period of its existence, it has also been already introduced into various branches of industry, such as perfumery, soaps, creams, and pomades, also for greasing leather-belting and for improving the pliability of leather, while quite recently a German officer—Von Kleist—was induced by Liebreich's discovery that cholesterin is present in the hoof of the horse, as well as in the skin of various animals, to employ it with very successful results as a lubricant for horses' hoofs.

The process employed in the industrial manufacture of lanolin is based on Schulze's method. The crude wool-grease or wool-oil is obtained in the usual way by treating the natural greasy wool with soap liquors, and then decomposing these by mineral acids. According to Jaffé and Darmstädter, the crude wool-oil contains about 70 per cent. (principally cholesterin), and 30 per cent. of fatty acids. The main object of the industrial chemist is to obtain from this mixture the lanolin in a pure state, and this difficulty has been successfully overcome by the two Berlin chemists just referred to, who (according to Liebreich) have succeeded in producing a lanolin of great purity, and to their kindness I am indebted for this collection of samples, showing the different stages of manufacture.

The first operation consists in saponifying the fatty acids of the crude wool-grease by means of caustic soda. An emulsion is thus obtained, which, on dilution with water, gives the so-called wool-milk. When this milk is subjected to centrifugal action, it separates, like cow's milk, into so-called cream and skim-milk. The cream contains the lanolin, and on precipitation by a lime-salt, we obtain the crude lanolin. This is heated, when water separates from it, and the lanolin is then further purified from its waxy impurities—higher-melting cholesterin—which are always present in the crude form, by a process which has been patented quite recently. The lanolin is much improved by the removal of these waxy substances, and the product thus obtained is the *Lanolinum anhydricum*, and this pure anhydrous lanolin is finally converted by being kneaded, with 30 per cent. of water, into *Lanolinum purissimum*.

In conclusion, I may add that Liebreich, in his investigations, in order to ascertain the presence of lanolin or cholesterin in other fats, made use of the method first described by Liebermann for proving the presence of cholestol, a substance closely allied to cholesterin, which test consists (*Berichte*, 1885, p. 1803) in dissolving the substance to be tested for cholestol or cholesterin in as much acetic acid anhydride as will allow it to remain in solution on cooling, and then adding, drop by drop (cooling at the same time), concentrated sulphuric acid. If cholesterin is present, the solution first turns pink, but soon changes to a fairly permanent blue colour.

The following tests are recommended for ascertaining the purity of commercial lanolin:—

1. If 2–3 grms. of lanolin be put into a small flask with 10 c.c. of a 30 per cent. solution of caustic soda, and the mixture be heated, red litmus paper placed at the top of the flask must not turn blue—disengagement of ammonia.

2. If 10 parts of lanolin be heated with 50 parts of distilled water in a water-bath, the lanolin must separate as a clear oil. Impure lanolin becomes frothy and turbid.

3. If oily, lanolin thus separated must be free from glycerin.

* Messrs. Jaffé and Darmstädter.

4. If mixed or well rubbed with water on a ground-glass plate with an iron spatula, the result must be a product containing over 100 per cent. of water; and if the lanolin employed is pure, the kneaded mass will be sticky and paste-like; but if impure, the mass will possess a soap-like smoothness, and will not adhere to the spatula.

The last chemical substance, formerly, and till quite recently, a preparation or specimen only figuring in the museum or laboratory of the organic chemist, now an article of chemical industry, is one called "Antifebrin."

Antifebrin or Acetanilide, C_8H_9NO.—It may interest some of our members to inspect the specimen which I have here of the above-named very latest febrifuge. It has been known to chemists for a considerable number of years. Acetanilide is said to be far more effective than quinine in the reduction of fever, and even four times more powerful in its action than antipyrin. As its method of preparation is extremely simple, and the raw material from which it is made not costly, its price is, of course, very much lower than that of antipyrin. I need scarcely add that antifebrin is made by simply heating for some time aniline and glacial acetic acid, and afterwards distilling the acetanilide.

$$NH_2C_6H_5 + HO.CO.CH_3 = N(CO.CH_3)C_6H_5.H + H_2O.$$

SOPHORA SPECIOSA, BENTHAM.*

BY MORITZ KALTEYER, PH.G., AND WILLIAM E. NEIL, PH.G.

This evergreen shrub is a native of Texas and New Mexico, flourishing on rough rocky hill sides, and avoiding the rich black soil of the prairie. Near Matagorda Bay it is a small tree about thirty feet in height; near San Antonio it attains the height of six or eight feet, and grows in patches, intermingled with the mezquite, often clinging to the edge of a ledge of rock with large portions of the roots bare and exposed to the heat and cold of many summers and winters, and by its long tap root enabled to withstand the frequent droughts. The trunk is tough, crooked and rough, with a grey-brown thin bark, and with hard and heavy yellow wood, which in some localities is called *lignum vitæ*. The leaves are imparipinnate; the leaflets in three to five pairs, about one and a half inch long, obovate or oblanceolate, obtuse or emarginate, entire, reticulate, dark-green and glossy above, and paler beneath. The showy flowers appear in February and March, grow in racemes, and have a blue-purple papilionaceous corolla, ten distinct stamens and a strong fragrant odour. The fruit is indehiscent, more or less moniliform, often curved, greyish-pubescent, and contains from one to eight seeds. The seeds are roundish-ovate, about half an inch long and three-eighths of an inch thick; the testa is hard, brittle, somewhat granular, dark-red or sometimes yellowish, and marked from the slightly flattened hilum by a longitudinal ridge. It contains a thin layer of firm whitish albumen, and an embryo of the shape of the seed, with two white, rather concavo-convex, cotyledons and a short radicle bent at a right angle. The average weight of the seed is twenty grains, that of the kernel about twelve grains, and of the integuments eight grains. The seed is inodorous, and the taste bean-like and somewhat bitter. Though known to be poisonous, and hence called *poison-bean*, it is largely used by boys in place of marbles.

Mr. Bellinger, of Texas, states that the Indians in the neighbourhood of San Antonio used the seed as an intoxicant, half a bean producing exhilaration, followed by sleep lasting two or three days, and it is asserted that a whole bean would kill a man.

Some years ago (see *Am. Journ. Pharm.*, 1878, pp. 33 and 283), the seeds attracted attention through the investigation of Dr. H. C. Wood, who isolated a poisonous alkaloid, *sophorine*. Both Mr. Kalteyer and Mr. Neil found the alkaloid in the testa and in the kernel.

* From the *American Journal of Pharmacy*.

Mr. Neil obtained 3·2 per cent. of ash from the whole seed; Mr. Kalteyer 3·1 per cent. from the kernel, and 7·6 per cent. from the integuments; the former contained chloride, phosphate and a trace of sulphate of potassium, calcium and magnesium, while in the latter phosphate and chloride of potassium and calcium, with a trace of manganese were found.

For proximate analysis the integuments and kernel were used separately; from the description given it seems that the layer of albumen was added to the embryo by Mr. Neil, and to the testa by Mr. Kalteyer.

Mr. Neil's results were as follows:

	Testa. Per cent.	Kernel. Per cent.
Extracted by petroleum benzin.	5·60	18·200
,, ,, ether	lost	·153
,, ,, absolute alcohol .	1·26	1·860
,, ,, distilled water .	12·00	26·500

The alkaloid was found in the alcoholic extracts; slight traces of it were also observed in the other extracts from the kernel. The specific gravity of the yellowish-red fixed oil, obtained by benzin from the kernel, was determined to be ·889; it was insoluble in alcohol, but freely soluble in ether, chloroform and carbon bisulphide. The presence of sugar was determined by Fehling's solution in the water extracts. As far as examined the other constituents agree with those determined in the following analysis.

Mr. Kalteyer's results are tabulated as follows:—

	Percentage from Testa.	Kernel
By *petroleum spirit*: Saponifiable fixed oil, sp. gr., ·912 .	1·300	21·050
By *ether* (resin or wax). . .	·100	trace
By *alcohol*: Phlobaphene . .	1·000	2·610
Alkaloid, organic acids (tannin in testa) and other organic substances . .	2·350	7·540
By *water*: Inorganic salts .	1·000	2·300
Mucilage	4·150	1·500
Albumen	—	1·750
Dextrin	1·900	2·200
Organic acid and colouring matter	6·900	6·000
Soluble arabic acid? . .	1·050	6·573
By *caustic soda*: Mucilage and albuminoids	1·200	9·070
Not precipitated by acetic acid and alcohol . . .	3·700	4·250
By *hydrochloric acid*: Parabin.	3·750	6·450
Lignin	6·876	4·380
Insoluble residue.	55·084	14·945
Moisture	9·575	7·500

The colouring matter of the testa was not taken up by petroleum spirit or ether, but was freely soluble in alcohol and in alkali; it is precipitated by lead acetate, and, using alum as a mordant, gave a light pink-coloured dye.

The alcoholic extract was treated with water, the solution precipitated with lead acetate, treated with sulphuretted hydrogen, and both acid and alkaline, agitated with solvents; the alkaloid was taken up by chloroform from the alkaline liquid, and seems to be present in larger proportion in the testa than in the kernel. An aqueous solution gave with potassio-mercuric iodide a bulky white, and with gold chloride a crystalline yellow precipitate. Sulphuric acid and potassium chromate produced at once a muddy-brown colour, rapidly changing to light green, which slowly faded. Sulphuric acid gave a light flesh-coloured solution; ferric chloride only a perceptible darkening.

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1886.

ANOTHER year having come to an end the task devolves upon us of putting on record, according to the practice in this Journal now for several years, a summary of the events during the past twelve months which seem to be of special interest to the pharmacists of this country. It can hardly be claimed that the year 1886 has been a remarkable one in the annals of pharmacy, except that in one respect its leaders who have been long working for an advance in a definite direction, and had hoped that they were near the attainment of their object, have suffered a temporary reverse. But before proceeding to discuss this subject more in detail it will be well to refer to the body from which most efforts of this kind emanate, and which is the legally recognized representative of the chemists and druggists of Great Britain. The constitution of the Council of the Pharmaceutical Society shows a slight alteration as compared with the previous year. Mr. CHURCHILL, who has for several years past occupied a seat on the Council, declined to allow himself to be again nominated on the ground of ill-health. Although only one vacancy was thus created, there were twenty-one candidates for the fourteen seats to be filled, the result being that Mr. YOUNG and Mr. P. W. SQUIRE were displaced, and Mr. A. SOUTHALL, Mr. CROSS and Mr. BAILDON joined the Council as new members. At the first meeting of the Council, in June, Mr. MICHAEL CARTEIGHE was again re-elected to the office of President, which he has now occupied since June, 1882, and Mr. JOHN ROBBINS to the office of Treasurer, which he has occupied since June, 1880. Mr. T. P. GOSTLING was also elected to succeed Mr. S. R. ATKINS as Vice-President.

At the opening of the past year there appeared to be reason for anticipating that pharmaceutical education would be placed in a more satisfactory position in this country. The Council of the Society had long been engaged in elaborating the details of a systematic curriculum of study by which this might be effected, and amendments of the Bye-laws embodying the result of this work were then under consideration by the Privy Council. Unfortunately they did not meet with the expected approval of that department, and the consequent failure of the Council's efforts constitutes one of the most marked features in the history of the year. The first communication received from the Privy Council in reference to this subject was considered to leave some uncertainty whether the objects which the Council had in view might not have been realized by means of regulations made by the Board of Examiners. The result of further correspondence, however, showed that such was not the case, and the letter from the Privy Council read at the meeting of Council held last July left no doubt that the changes in the training and examination of candidates hoped to be effected by the proposed bye-laws must for the time be abandoned. On that occasion Mr. SCHACHT gave expression to the pain he felt at having thus to relinquish the project which the Council had been so long engaged with. Though he had clung to the hope of receiving assistance from the Government to accomplish what many had very earnestly desired for promoting the progress of the younger section of the body, he felt bound to recognize that the Council was in fact beaten all along the line. At the Council meeting held last November Mr. SCHACHT again took up this subject, by bringing forward a motion, of which he had given notice, that the Law and Parliamentary Committee be requested to draft a bill having for its object the amendment of the clauses in the Pharmacy Act which bear upon the Society's examinations, the amendments to be so framed as to admit of the changes that have received the approval of the Council. In bringing this motion forward Mr. SCHACHT reviewed the circumstances under which the existence of a deficiency in the training of those who presented themselves as candidates for the examinations had become evident, and the need for an improved system had been ascertained by experience. Referring, also, to the fact that the Council was thoroughly convinced that a certain course of training was highly desirable, he argued that the Council should seek to obtain the power required for the purpose by Act of Parliament. Taking the view that the provision for this was an affair of internal organization, he was of opinion that it should be obtained in the simplest form possible, and that it should stand by itself. By this means the opposition that might be offered to a bill in which other interests were affected would be avoided, and a short bill having for its object only the modification of those clauses of the Pharmacy Act which bore upon the subject of the examination and training of candidates for pharmaceutical qualification would not be likely to excite the opposition of anyone. The only object of such a bill would be to make those who practised pharmacy a more highly qualified body. With every respect for the arguments that had been put forward as to the desirability of better education for those entering the business of pharmacy, he held that there was only one means of removing the difficulty now experienced in organizing

educational institutions, and that was making education compulsory. Until that was done nothing could be hoped for but a continuance of the failures that had been experienced with the older institutions as well as the most recent ones. Having gone so far in this matter and obtained a large amount of endorsement from its constituents generally, the Council would be stultifying the work of the last four years if it stopped short without taking the next step forward, which he then proposed. The general tendency of the discussion which followed Mr. SCHACHT'S motion was in favour of its adoption, and notwithstanding some questions that were raised on grounds of expediency, it was eventually carried by a considerable majority.

Very shortly after this subject had been discussed by the Council it was specially dealt with by Mr. BARCLAY in an inaugural address to the Midland Counties Chemists' Association. The picture he gave of pharmaceutical education in the provinces, as the result of extended inquiries he had made, showed the utter absence of any adequate provision for the purpose, though considerable efforts have been made in various towns to establish classes and to induce apprentices and assistants to take advantage of the facilities for study offered by public institutions. Whatever success has attended those efforts, has been, for the most part, fluctuating and uncertain. The main conclusion to be drawn is, that in the absence of compulsion there can be no hope of education being sought for or of endeavours to provide it being appreciated and made due use of. Hence Mr. BARCLAY'S picture of the state of pharmaceutical education in the provinces constitutes a strong argument in favour of the course advocated by Mr. SCHACHT, and though he did not extend his consideration of this subject to the schools in London it was evident that he did not regard them as equal to satisfying the wants of the provinces. By stress of circumstances students are now driven, whether they like it or not, to the schools in London, not altogether for education in the proper sense, but "to be posted up in such a way as will enable them to get through their examinations." This is the greatest of all the evils resulting from the absence of a compulsory system of education. Consideration of the subject from a trade point of view also led Mr. BARCLAY to the conclusion that the best thing to be done for improving the position of the chemist is to promote this higher education, and he takes it as acknowledged on all hands that for this purpose the present system must be changed. For those who might thus be prevented from coming into the business Mr. BARCLAY does not appear to share the mistaken sentimentality that is sometimes made a ground for objecting to improved education. On the contrary, he expresses the very sensible opinion that it is in fact to the interest of the assistants and apprentices now in the trade to keep others out, and that while it would certainly be to the interest of the public that chemists and druggists should be better educated, it could be no hardship on those who were excluded because they have not been sufficiently educated.

But while thus supporting a compulsory system of education Mr. BARCLAY does not altogether approve of the curriculum proposed by the Council, and the chief point to which he objects is that from the time the apprentice enters the business until the three years' term has expired he would have no necessity laid upon him to study. Hence he fears that when the time came for the second or intermediate examination to be passed, the apprentice would go to some cram school to enable him to get through his first technical examination. Mr. BARCLAY would therefore substitute in place of the ordinary mechanical routine of work, which the apprentice is now ordinarily put to, a curriculum by which in his first year he would pass from his school work to the science class, and thus continue his studies without a break. Such a system would entail very material alterations in the conditions of apprenticeship, but there can be little doubt that it would be advantageous to the apprentice, and so far eminently desirable. Mr. BARCLAY'S views as to the means by which such an educational system might be carried out in the provinces are in favour of the establishment of tutorial classes, and he suggests a modification of the plan adopted by the Science and Art Department, by which it is necessary for a teacher to have a local committee of five to superintend his work. He thinks that in almost any town where there were a sufficient number of students to form a class, a qualified teacher could get five chemists to constitute a committee, and that he might then obtain permission to commence from the Council of the Pharmaceutical Society. Under this scheme it is proposed that one of the Society's local secretaries should be *ex-officio* a member of such committee. It is also proposed that the fees should be small, and supplemented by capitation grants from the Pharmaceutical Society. The fact that the Society could afford such an expenditure is, however, a poor argument in favour of it. On the contrary, it would appear more fitting that if the education is valued it should be proportionately paid for, and anything like an eleemosynary promotion of study carefully avoided.

This scheme presents a general resemblance to that which had been previously sketched out by Mr. GREENISH in his Presidential address to the British Pharmaceutical Conference at Birmingham last August, and is in some details identical with it; but instead of the tutorial classes to which Mr. BARCLAY gives a preference, the idea was to utilize as far as possible existing university or college teaching, and to focus, as far as possible, the demand for it. Many of the provincial districts marked out by Mr.

Greenish contain within their limits important educational institutions, which would no doubt be ready to include in their curriculum the teaching required of them, were there any evidence of an adequate demand for it. One of the difficulties recognized in this case, was the very loose manner of receiving and employing apprentices, and it is really of primary importance to bear in mind that a youth destined for pharmacy should, before leaving school, have been taught at least the elementary branches of a good English education, in order that he may be able to master the principles of those sciences which directly or indirectly govern the practice of pharmacy. The passing of the Preliminary examination should therefore be invariably insisted upon before a youth is taken as an apprentice, and he should enter upon the duties of that capacity with a distinct view of the course of study that he will be required to follow out in the future, for the purpose of acquiring a qualification to carry on business for himself. That there is in this respect a grievous deficiency in many instances is but too plainly shown by the records of failure in the examinations that have so often been referred to. Pending the elaboration of a more satisfactory mode of dealing with this question, the Council, it may be added, is following up its practice of assisting local effort, and during last year it made grants of £25 each to local committees in Sheffield, Leeds and Leicester.

Among other evidences of appreciation of the want of an educational system for pharmacists, the paper read by Mr. Dymond before the Chemists' Assistants' Association last October may be mentioned as one of the most encouraging indications for the future. After pointing out that while under a purely voluntary system examination may be relied upon as a test of education, because only those who desire education present themselves for examination, he urged that it cannot be trusted to for ensuring education when the examination—the means by which qualification is to be obtained—is compulsory, and it was shown that this great difference had a very important effect. Passing the examination is now the one thing sought for, and, consequently, teachers cannot educate because students do not care to be educated, and examiners are often at a loss to tell whether candidates really understand the subjects they are questioned upon, or have only got up by heart enough to enable them to answer the questions put to them. Hence, it was argued, that for the welfare of the pharmaceutical body, as well as the credit of the Society, it was desirable to establish a compulsory system of education, and, to elicit the sense of the meeting on this point, Mr. Dymond proposed the motion "that the meeting was of opinion that examination connected with a compulsory course of education was a trustworthy test of qualification." This was carried by a large majority of those present at the meeting, and it was unanimously resolved that a copy of the resolution should be forwarded to the Council of the Society. An equally high tone marked the address delivered by the President of the Edinburgh Chemists' Assistants and Apprentices' Association, Mr. W. Duncan, at the commencement of the winter session. The School of Pharmacy Students' Association was also fortunate in receiving valuable counsel in the same direction in an eloquent address from Mr. S. R. Atkins.

Most valuable light is always thrown upon this educational difficulty by an analysis of the results of the examinations. During the year 1886 the Board of Examiners for England and Wales met six times, and that for Scotland four times, and four Preliminary examinations were conducted by the College of Preceptors. The total number of candidates that entered for examination was no less than 2476, so that the progressive increase which has been observable for several years past was maintained, until last year the number reached was only a little below that of 1874, which was abnormally high in consequence of the inrush of candidates anxious to forestall the more stringent regulations that came into force in the following year. The candidates for the Preliminary examination numbered 1305, of whom 632, or 48·4 per cent. passed, being a lower average than in the preceding year, when 690 out of 1274 passed, or 54 per cent. In addition, 67 certificates of other examining bodies were accepted in lieu of examination, so that, altogether, 699 persons advanced last year the first stage in the pharmaceutical career. For the Minor or qualifying examination there were 1070 candidates, against 955 in 1885, of whom 398, or 37 per cent., passed, the average of passes having been practically the same as in the previous year. For the Major examination there were 93 entries, and 56 passes, which is the highest number and best result in this examination for several years past. So far, however, as the foregoing figures indicate the measure of success—or rather of the want of success—of candidates coming up for examination, none of them can be regarded as satisfactory, except so far as to show that the examiners have not flinched in the performance of a very unpleasant, though necessary, duty. An illustration of the incompetency which is too frequently met with in the examination room was furnished in an interesting note appended to the report of the College of Preceptors on the October Preliminary examination, from which it appears that failures in this examination are still far more numerous in the subject of arithmetic than in either of the other two, and that out of 73 candidates who were then unsuccessful in it, only 8 gave a correct answer to the first question, which was a comparatively easy one in compound subtraction and multiplication.

Another subject that has been under the consideration of the Council is the Poison Schedule. In February the Law and Parliamentary Committee, after consideration of a communication from the

Privy Council on the subject of nitroglycerine, reported in favour of this compound being included in the first part of the Poison Schedule, and that additions should be made to both the first and second parts of sundry other substances that had been so included in the Government Poison Bill of the previous year; also that the opportunity should be taken to direct the attention of the Privy Council to the large number of cases of poisoning by carbolic acid. The report having been adopted, a communication to that effect was made to the Privy Council; but in the reply it was intimated that while their lordships would be prepared to approve a resolution relating to nitroglycerine, the suggestions in relation to the other substances would be considered when preparing a Bill that it was proposed to introduce shortly into Parliament. The session ended, however, without any such Bill being introduced. In May the Council passed the desired resolution declaring nitroglycerine and its medicinal preparations to be poisons within the meaning of the Pharmacy Act, and that they should be included within the first part of the schedule, but up to the present time the promised approval by the Privy Council has not been forthcoming.

A Bill for the Amendment of the Medical Acts having been introduced into Parliament it became necessary to decide whether an attempt should be made to amend it so as to provide for the legal representation of pharmacists on the Pharmacopœia Committee. After ample consideration it was resolved that it was not expedient to take any action that would endanger the passing of the Bill. Since that time the Medical Council has resolved that it is desirable its Pharmacopœia Committee should be assisted by annual reports on published researches and opinions of therapeutists, pharmacologists, pharmaceutical chemists and chemists and druggists, and has appointed Professor ATTFIELD as the first Reporter.

At the Annual General Meeting held last May, the President was able to congratulate the members on the prosperous financial position of the Society, both as regards the General Fund and the Benevolent Fund, though the support rendered to the latter has not been so widely extended as might be desired. The inability of the Privy Council to approve the amended Bye-laws as they then stood was briefly referred to, and the expressed intention of the Government to introduce a Bill on the subject of poisons was mentioned as a matter requiring the attention of the Council. In referring to the refusal of the Privy Council to adopt the recommendation that other articles besides nitroglycerine should be added to Part I. of the schedule, or to consider that part of the subject until the new Bill was being drafted, the disposition of the Privy Council to absorb the power now vested in the Council of the Pharmaceutical Society was pointed to as being apparently still operative, the President remarking that if the advisers of the Privy Council thought articles put in its own Bill of the previous year were then fit substances to be considered as poisons, there could be no valid reason why they should not be placed in the schedule at once, as the Council of the Society had recommended. The proposed extension of the Society's premises was described as a measure of necessity for the proper conduct of business, and for carrying out the work of the research laboratory. The position of the Society's affairs in Scotland was at that period such as would not admit of being dealt with further than by the expression of a hope that the scheme contemplated by the Council would meet with acceptation from the members generally, and even that of Scottish members.

It is satisfactory to be able to point to the fact that there has since been a settlement of the differences between the Council and Scottish members of the Society, to which reference was made in the review of the previous year. Those differences had been a source of much regret to many who did not take a very decided view on either side, but were influenced chiefly by the feeling that internal dissensions could only be injurious to the Society, and it is therefore matter for congratulation that in a spirit of mutual concession a satisfactory and amicable arrangement has been arrived at. This is of all the more importance since the North British Branch of the Society has established a precedent for local organizations in other parts of the kingdom and the good work that has been done in the past under its influence would well justify the flattery of imitation. Probably there never was a time when unity and organization were more necessary for pharmacists than at the present, both in regard to trade matters and the means of advancing the interests of the body by improved education. If the suggestions offered by Mr. GREENISH for the formation of local centres of organization among members of the Society could be carried out, it is probable that much good might be effected in the way of increased provincial activity in the promotion of the great objects of the Society and furnishing a practical answer to the somewhat unreasonable grumbling that is too often heard. Such local organizations among members of the Society need in no way supersede or interfere with other local associations, since their objects would be more special than those of the latter. Wherever there are now local secretaries those officers of the Society might form the nucleus for local organization, and in some instances, when combined action was desirable, they might be of great practical service by their more direct connection with the central institution.

The Society has held the usual number of Evening Meetings during the past year; most of them were fairly well attended, and one or two exceptionally so. The October meeting, for instance, seldom lacks an enthusiastic audience, but, probably, never had one fuller or more enthusiastic than that which

listened to the scholarly and graceful address to the students by the President of the Medical Council. Other meetings specially worthy of mention, are that in November, at which the drug exhibits at the Colonial and Indian Exhibition were described, which was attended by a number of influential colonial representatives, and that last month, at which Dr. AITCHISON made so important a contribution to the history of the umbelliferous gum resins. The papers read during the year were: "Tumbeki," by Mr. E. M. HOLMES; "Analysis of Tumbeki," by Messrs. E. J. EASTES and W. H. INCE; "Modified Extraction Apparatus," Mr. W. H. INCE; "The Alcoholic Extract of the Root of Atropa Belladonna," by Messrs. W. DUNSTAN and F. RANSOM; "The Presence of Potassium Nitrite in the Potassium Hydrate of Commerce," by Professor W. DUNSTAN; "Note on the Species of Strophanthus used in Medicine," by Mr. E. M. HOLMES; "Note on a Sample of Hopeine," by Dr. B. H. PAUL; "Note on a New Variety of Rhatany," by Mr. E. M. HOLMES; "Some of the Drug Exhibits at the Colonial and Indian Exhibition," by Mr. E. M. HOLMES; "Note on Tincture of Strophanthus," by Mr. W. MARTINDALE; "Some Plants of Afghanistan and their Medicinal Products," by Dr. J. E. T. AITCHISON; and "Notes on a Sample of Galbanum from Ferula Galbaniflua," by Mr. E. G. BAKER. In addition, it may also be recalled here that an interesting series of six lectures on Galenic Pharmacy has been delivered by Emeritus Professor REDWOOD.

The Museum of the Society has been greatly enriched during the past year by many large and valuable donations. Some of these have been received from well-known wholesale firms, or from private individuals, but the most extensive additions have been made through the liberality of the Commissioners of the Colonial and Indian Exhibition, and of several of the exhibitors, some of the latter having handed over their entire exhibits to the Society. Among the last-named are the valuable exhibits of Dr. HO KAI and Messrs. A. S. WATSON and Co. in the Hong Kong Court, the former including over four hundred specimens of Chinese drugs, and the latter, several valuable models. Not less important are the exhibits of Dr. BROOKS, including vanilla and valuable specimens of essential oil, from the Seychelles, and that of Mr. FRESSON, of Demerara. The India Court contributed a most useful series of sections of the trunks of the cinchona trees cultivated in that country, which show the mode of renewing the bark. The whole of the collection of Ceylon drugs (three hundred and fifty specimens) has been acquired by the Society, as well as the collection of Chinese drugs in the Straits Settlements Court, the latter having been presented by the Executive Commissioner. Valuable contributions to the Museum have also been received from the Executive Commissioners of the British Guiana, West Indian, Victoria and Fiji Courts. The materia medica of the Cape of Good Hope is now represented in the Museum by an entire series of the drugs exhibited in that Court, presented by Mr. SIDNEY COWPER. In addition to these, a very extensive and valuable collection of essential oils, many of them of great rarity, has been presented by Messrs. SCHIMMEL and Co., of Leipzig. Dr. AITCHISON has handed to the Society a collection of the drugs obtained by him in Afghanistan, and specimens of considerable interest have been received from the Director of the Kew Gardens, from Dr. DYMOCK, of Bombay, Dr. ONDAATJE, of Ceylon, Mr. MURAI, of Japan, and many others. The large contributions to the Museum during the last few years have raised it to the first rank as a Museum of Materia Medica; so that it has lately been classed in a well-known periodical (*Nineteenth Century*) with the National Museum of Natural History at Kew and the British Museum.

The Herbarium has been enlarged by the addition of about one hundred and fifty of the medicinal plants of the Mauritius, presented by the Director of the Department of Woods and Forests in that island, the last-named donation having been rendered all the more valuable by the previous gift of a number of the drugs themselves from Mrs. JOHNS, of Brentford. Some excellently preserved specimens of the more valuable native remedies of South Africa have been presented by Dr. ANDREW SMITH, of the Lovedale Mission, and three of the Afghanistan plants collected by Dr. AITCHISON, one of them being *Ferula galbaniflua*, have been presented by that well-known botanist. A second addition of about one hundred and fifty specimens has been made to the Herbarium of British plants through the liberality of Mr. J. W. WHITE, and several rare species have been presented by other gentlemen.

The principal donations to the Society's Museum in Edinburgh have been a collection of new remedies, presented by Messrs. T. CHRISTY and Co., and a series of the commercial varieties of carbolic acid and of the sulphocarbolates of various metals, by Messrs. CRACE-CALVERT and Co.

The Library during the past year has been enriched by the addition of 289 volumes and pamphlets. It is to be regretted that notwithstanding the high state of efficiency in which this department is maintained under the supervision of the Committee, there should be any indication of falling off in the extent to which it is utilized. Nevertheless we have to report that the attendances at the Library have shown a decrease both in the morning and in the evening, the number of signatures in the book having been only 6351 against 7294 in the previous year. Moreover, the loans of books have shown again a slight decrease, which has been continuous since 1881.

The operation of the Benevolent Fund has been fully maintained, no less than £1597 10*s.* having been paid in annuities, and £631 14*s.* 5*d.* in casual grants, both sums being in excess of the amounts

expended for similar purposes in the previous year. The total amount of relief granted during the year amounted therefore to £2229 4*s.* 5*d.* Unfortunately the income during the same time has shown a considerable decrease, the subscriptions having fallen off from £1529 4*s.* 5*d.* to £1451 16*s.* 11*d.*, the donations from £378 to £34 13*s.*, and the legacies from £300 to £140. In fact the income of the Fund from all sources has been very slightly in excess of the expenditure, although six more annuitants were elected only last month, so that under present conditions the Council will hardly be warranted in further extending the obligations of the Fund. In the coming year, however, the usual decennial dinner in aid of the Fund is to be held, and it may be hoped that the occasion may not only evoke a large number of donations, which is the form frequently adopted by firms of contributing to the Fund, but may also be the means of ingathering a large number of subscribers from the ten thousand registered persons who, though entitled to participate in case of need in the benefits of the Fund, have never yet contributed to it.

The British Pharmaceutical Conference commenced its annual meeting at Birmingham at the end of August; the attendance was good, and the gathering a very successful one. The President, Mr. Greenish, in his address, made somewhat of an innovation by bringing two subjects definitely before his audience with an implication that they should be made the subjects of resolutions by the Conference. The first was the disadvantages attending the multiplication of proprietary preparations that are prescribed by medical men, the suggestion being that a committee should be appointed to compile a formulary of unofficial preparations that should be issued under the auspices of the Conference for the guidance of prescribers and dispensers. The other subject was the more thorough local organization of chemists and druggists for united action throughout the country, especially in respect to the provision of facilities for the acquirement of a suitable scientific training by young pharmacists in the provinces. This it was proposed to effect by dividing the county into districts, and entrusting the work to representative committees, and in consideration of the fact that the Pharmaceutical Society might be called upon to contribute from its funds to the necessary expenses, it was proposed that the local secretaries of a district might constitute the committee. The latter proposition failed to obtain any support from the meeting; but in compliance with the former an influential Unofficial Formulary Committee was appointed, which, under the chairmanship of Mr. W. Martindale, is now engaged in compiling a report to be submitted to the Executive Committee of the Conference.

The Chemists and Druggists' Trade Association held its annual meeting in London in May. The report then presented by the Executive was a very dispiriting one in respect to the future, there having been again a large decrease in the membership. From financial reasons principally a course which it had been intended the Association should take in respect to the registration of trade marks has had to be abandoned; but nevertheless proceedings have been carried to a successful issue in several cases for offences under the seventeenth section of the Pharmacy Act. A meeting of chemists and druggists resident in London was also called under the auspices of the Association to consider what course, if any, should be taken in respect to prosecutions under the Medicine Stamp Act, but it cannot be said that it yielded any very tangible result. Of the other societies in which pharmacists may be supposed to be interested it may be mentioned that the British Medical Association met at Brighton in August; the British Association at Birmingham in September; the Society of Chemical Industry at Liverpool in July; the American Pharmaceutical Association at Providence in September; and the German Apotheker-Verein at Düsseldorff in August. There was also an Inter-Colonial Pharmaceutical Conference for the discussion of topics common to Australasian pharmacists held in Melbourne, in October.

In Ireland the Council of the Pharmaceutical Society has been occupied largely in the consideration of the conditions of the examinations and the Government Visitor's Reports upon them. The Annual Meeting was held at Dublin in October, when the retiring President (Mr. J. E. Brunker) defined the position of the Society by saying that it had not "much to boast of, but it had made some little progress during the year." There had only been an increase of one in the paying members since the previous year. Mr. Brunker, having filled the office of President for three years, a limit previously fixed by a resolution of the Council, declined re-election, and Mr. Allen was unanimously chosen to succeed him, Mr. H. N. Draper being elected Vice-President. It only remains to be said that an attempt to enlist the interest of the Government in Bill for the amendment of the Irish Pharmacy Act has been unsuccessful.

The year has not passed without a few—probably not very important—additions having been made to the materia medica, though these have come in the form of products from the laboratory of the chemist rather than as unworked material from the stores of Nature. Further contributions have also been made to the history of several of the vegetable medicines already in use. Of the former class one of the most interesting has been introduced under the significant name of "antifebrin," which, should the properties attributed to it on the basis of preliminary clinical experiments be confirmed, will take a position in the first rank of antipyretics. It is a compound having the constitution of an acetanilide, or an aniline in which one atom of hydrogen in the NH_2 group has been re-

placed by an acetyl residue. The compound is not a new one, having been prepared by GERHARDT more than thirty years ago by the reaction of glacial acetic acid upon aniline, but its alleged medicinal properties appear to have remained unsuspected. In fact, no other member of the same chemical group was known to possess antipyretic properties; consequently the results reported to have been obtained with acetanilide have directed attention to other anilides as well as acetyl compounds.

Methylal is also a compound that has been taken down from an inglorious resting place on the laboratory shelf and brought into use as an anæsthetic and hypnotic. It is a product of the oxidation of methyl alcohol, probably having the constitution indicated by the formula $CH_2(OCH_3)_2$, and standing in the same relation to formaldehyd as acetal to acetaldehyd. Tribromide of allyl is still another compound to which the remark as to deferred usefulness may be applied; after thirty years it has been administered successfully in the relief of hysteria, asthma, and angina pectoris.

Under the name of "salol," a compound which is represented as being the phenyl ether of salicylic acid has been introduced as a powerful antiseptic and antipyretic. The peculiar advantage claimed for it is that, while it passes through the stomach unaltered, it is broken up in the duodenum into carbolic acid and salicylic acid, both of which are then free to exercise their characteristic antiseptic properties without harm or inconvenience, no toxic symptoms resulting from the presence of the carbolic acid. The urine becomes blackish during the administration of salol, which is said to be excreted as urate of salicyl and sulphophenol. The decomposition of the compound was attributed by Professor von NENCKI to contact with the pancreatic ferment; but that this is not essential has been ascertained by Mr. JOHN MOSS, who, in a paper read before the British Pharmaceutical Conference, stated it was due to the alkalinity of the pancreatic juice, and that even the salivary secretion was sufficiently alkaline to effect it. Some secrecy was maintained for a time as to the method of manufacturing salol; but it has been recently stated by Dr. C. KOLBE that it is prepared by the ordinary method of preparing similar ethers, by heating molecular proportions of sodium salicylate and sodium carbolate together with phosphorus pentachloride, the end products of the reaction being salol, sodium chloride and phosphoric anhydride. More recently Dr. ECKENROTH has stated that the phosphorus pentachloride may be replaced by carbonyl chloride (phosgene) gas.

Urethan is another compound which although not, strictly speaking, an introduction during the past twelvemonths, has proved worthy of more than the brief reference accorded to it in the last annual summary. Moreover, it has a special interest as being a compound of which the properties were deduced by theoretical considerations before being put to a clinical test. Briefly it may be stated that pharmacological experience having led to the expectation that ethereal salts of carbamic acid would partake of the physiological properties both of the hydrocarbon group and of the NH_2 portion of the acid, experiments were made with ethyl carbamate, better known as "urethan," and it was found to produce profound narcosis, whilst at the same time the respiratory movements were increased in frequency and depth, the latter action being attributed to the influence of the NH_2 group. Urethan appears to have a promise of usefulness as a narcotic in cases where the administration of chloral hydrate is contraindicated. It may be added that whilst some of the carbamic ethers are unavailable on account of their insolubility, others, such as the methyl and ethylidene compounds, have not been found to present any special advantages. Urethan is also reputed to be an effective antidote to strychnine. "Hypnone," or acetopheno another compound that was mentioned in the last annual review conjointly with urethan, as having just been introduced as a hypnotic, does not seem to have made much progress in medical favour, at least in this country.

Besides the experiments that have been made as to the effect of substituting one radical for another in these synthetically produced compounds, similar trials have been made with some of the natural compounds. In one case, where an atom of oxygen in the caffeine molecule has been replaced by the ethoxyl group OC_2H_5, the resulting compound ethoxycaffeine, is reported to manifest physiological and therapeutic properties decidedly different from those of the caffeine from which it has been derived, as it exercises a marked sedative action upon the cerebro-spinal system and possesses incontestably narcotic powers. On the other hand, the introduction into cocaine of an ethyl group in the place of a methyl group does not appear to effect any remarkable change, since ethylcocaine has been found to resemble cocaine qualitatively in its physiological action, but to be less powerful. The great instability of cocaine is now well known, simple contact of the free alkaloid with water being sufficient to decompose it, as first pointed out by Dr. PAUL and confirmed by Professor FLÜCKIGER. It may be remarked parenthetically that Professor FLÜCKIGER has found atropine to be similarly decomposed, though not so readily. The important consequences that may attend this instability of cocaine were illustrated in an article that was put forward to meet a demand for benzoate of cocaine, consequent upon a recommendation of it as an advantageous salt; upon examination by Dr. PAUL, this product proved to be simply benzoylecgonine, which had probably been formed by decomposition of the alkaloid in the attempt to prepare the benzoate salt. This benzoylecgonine, which may be described as cocaine minus the methyl group, appears, according to Mr. STOCKMAN'S experiments, to be devoid of anæsthetic proper-

ties, the effect it manifests being rather that of a tetanizing poison. It appears quite possible therefore that the occurrence of this and other comparatively inert contaminations—at least in the earlier samples of cocaine compounds—may explain the administration of enormous doses in some instances, faith in the reports of which led only recently to the sacrifice of a patient's life, as well as that of the operator, who committed suicide in consequence. In view, therefore, of the importance of purity in this alkaloid, the applications of which appear to be multiplying indefinitely, Herr BECKURTS has recommended that the hydrochlorate, which is the salt most used, shall be required to be absolutely neutral, volatilize completely, dissolve clear and colourless in water, give a colourless solution with strong sulphuric acid, not reduce potassium permanganate immediately, and when heated with an excess give off no odour of bitter almonds. In a chemical direction ecgonine, a still lower decomposition product of cocaine, has been experimented on by Herr MERCK with a view to confirm or otherwise a suggested relationship with tropine, the common nucleus of the belladonna group of alkaloids, but the results obtained were not decisive. Whilst upon this topic it may be mentioned that the leaves of a species allied to the coca plant, *Erythroxylon pulchrum*, have been examined for cocaine by Dr. PECKOLT, who reports that he found them to contain a minute quantity of the alkaloid. The fruit of *Erythroxylon Coca*, similarly examined by Mr. MILLARD, yielded only negative results. The wonderful success that has attended the introduction of cocaine has led to many suggestions as to the possibility of using other bodies as local anæsthetics, but hitherto cocaine has remained practically without a rival. Within the last few days, however, information has been received from the antipodes of the isolation from an euphorbiaceous plant, *Euphorbia Drummondii*, of an alkaloid which it is claimed produces local sensory paralysis, without any disturbance of the general system.

Another compound formed synthetically, which if it do not prove an addition to the materia medica is at least a most interesting product, is that which has been named "saccharine" on account of its intensely sweet taste. Systematically, its constitution is that of a benzoyl-sulphonic-imide, and as the starting-point of its production is toluene, it has not unfairly been classed among the ever-increasing army of coal-tar products. Considering the important commercial future that has been prognosticated for saccharine, its manufacture on an industrial scale appears to have been somewhat retarded, so that up to the present it has hardly been fully tested as to its capabilities. It would seem probable, however, that its sweetening properties will find practical application, and it may be that its physiological inactivity will allow of it being used for sweetening the food of diabetic patients; but the fact that a sample of a solution recently exhibited by Mr. HOWIE had after being kept a time developed an odour of bitter almonds and a slightly bitter taste proves that more experience is required in this direction.

The recommendation by Dr. MORRELL of terebene as a remedy for winter cough created for it some considerable demand in the early part of the year. A misleading disclaimer in the original paper respecting the article intended gave rise to some uncertainty, which was further increased by certain suggestions from another quarter as to patent rights; but this was soon cleared away, and it is now pretty well understood that the terebene to be used is the optically inactive product of the action of strong sulphuric acid upon turpentine, and that any person is free to make or sell it who may choose. That the liquid supplied as terebene does not, however, always correspond to the foregoing definition was shown in a paper by Mr. J. HODGKIN, read before the Pharmaceutical Conference, which gave the results of an attempt to estimate the amount of unaltered turpentine in samples of terebene by the indications of the polarimeter. In another paper Mr. LASCELLES-SCOTT reported that he had met with several samples containing oxidized products. It was a curious commentary on this striving after purity to hear Dr. TIDY assert that he had never found terebene to exercise any physiological action except when it was impure. It may be mentioned here that by oxidation by means of chromic acid of a solution of oil of turpentine in strong acetic acid, M. BOUCHARDAT obtained a modification, closely resembling in its properties oil of lemon.

Strophanthus seeds, from which Professor FRAZER extracted an active principle to which he has attributed useful properties in the treatment of some forms of heart disease, have been the subject of considerable attention during the year. The material originally experimented with was supposed to have been derived from *Strophanthus hispidus*, but this afterwards appeared doubtful, and samples of seeds subsequently received were probably derived from more than one species. Some uncertainty also existed as to the strength of the preparation used by Professor FRAZER, and this led to the publication of an authenticated formula for a 1 in 8 rectified spirit tincture of seeds previously treated with ether. Subsequently Professor FRAZER intimated his preference for a tincture of half the strength, and eventually Mr. MARTINDALE published a formula for a tincture of the strength of 1 in 20. The point is one eminently fitted for the decision of the Formulary Committee appointed by the Conference.

Lanolin is another substance which, although introduced as an ointment basis in the latter half of 1885, has became practically established during the year that has just passed. It has had the advantage of a distinguished sponsor in Dr. LIEBREICH, who has dowered its advent with a considerable addition to previously existing knowledge of the class of fats to which it belongs. These compounds differ from

ordinary fats in being combinations of fatty acids with cholesterin instead of with glyceryl. They appear to be widely distributed in the animal economy, but especially in feathers, bristles, wool, etc., and it is from the wool of sheep that lanolin is at present prepared, it being neither more nor less than a "suint" purified by thorough washing. It is claimed for it that it takes up a large amount of water without losing its unctuous consistence, does not turn rancid, and is absorbed by the skin with remarkable facility. Numerous reported experiments appear to confirm the ready absorption of many medicaments mixed with it when applied to the skin; but the recent experience of Dr. TOPOROFF seems to indicate that at least for ointments intended to produce an anodyne effect lanolin must yield the precedence to lard. Now, too, that the nature of vaselin is better understood it is evident that in respect to capability of absorption, at least, it is inferior as an ointment basis to lard. Nevertheless its right to a place in the Pharmacopœia is indisputable, and a discriminating use of both lard and vaselin, and possibly of lanolin also, will become a part of the art of pharmacy. "Mollin" is a name applied to another material that has been introduced as a base for outward applications, which consists essentially of a neutral soap containing a residue of undecomposed fat. Besides this, dressings consisting of medicated mixtures of suet and lard spread upon undressed muslin have been recommended under the names "plaster mull" and "salve mull."

The past year has furnished a reminder that the history of several very important articles in the materia medica still remains uncompleted. It seems, for instance, almost inexplicable that any uncertainty should still exist as to the mother-plants of articles so long and widely used as the umbelliferous gum resins, asafœtida, galbanum and ammoniacum. Some of this uncertainty has, however, now been removed, the appointment of Dr. AITCHISON to accompany the Afghanistan Delimitation Commission having given this accomplished naturalist and energetic collector an unusual opportunity of making inquiries respecting the plants in their native country, and the account of his observations which he gave last month at an Evening Meeting of the Pharmaceutical Society constitutes a most important addition to the information previously available on the subject. Whilst the gaps in our knowledge of old remedies are thus being gradually filled up, the vegetable kingdom still continues to yield fresh candidates for therapeutical experiment. "Pichi" (*Fabiana imbricata*), a Chilian remedy for urinary disorders, has been somewhat elaborately described and partially investigated. To the chemist it has given up a fluorescent body resembling æsculin and an alkaloid that has been named "fabianine;" but it is not clear whether its medicinal action is attributed to both or either of these. The rhizome and rootlets of *Aletris farinosa*, also a South American plant, have been recommended for the treatment of some disorders peculiar to females, their virtue presumably residing in a bitter principle that is most conveniently extracted by spirit. *Anchietea salutaris*, a Violaceous plant having a popular reputation in Brazil as an alterative, has been again recommended as a remedy in skin diseases. A new remedy for gout and renal disorders has been put forward in the leaves of *Orthosiphon stamineus*, an Indian labiate, from which a bitter glucoside has been separated and named "orthosiphonin. The root bark of the North American "snowdrop tree" (*Chionanthus Virginica*) has been recommended as useful as an aperient, cholagogue, diuretic and alterative. The umbelliferous *Amni Visraga*, besides supplying toothpicks, is said to be capable of yielding a narcotic principle—kelline—whilst the leaves are alleged to possess aperient and diuretic properties. The leaves of the *Agave americana* have also been credited with an acrid and balsamic constituent, useful as a rubefacient in rheumatism. "Itshongwee" is the name of an unidentified plant used by the Kaffirs as a febrifuge, which has been recommended as worthy of investigation. The leaves of the *Piper Betle*, used in the east to chew with areca-nut, are said to yield an essential oil that has given good results in the treatment of catarrhal disorders. The areca-nut itself, too, has yielded a volatile alkaloid—arekane—that is said to increase the secretion of saliva and have a purgative action.

A large number of more or less well-known plants have also been submitted to chemical examination, with results that may in some cases enrich materia medica. Thus the common furze has given up to Mr. GERRARD an alkaloid—ulexine—that appears to possess paralysing properties. The *Lobelia inflata* has proved to contain a second, but solid alkaloid, resembling lobeliine in its emetic action, both alkaloids being also present in *L. nicotianæfolia*. The alkaloid of conessi bark (*Wrightia antidysenterica*), widely used in India as a remedy for dysentery, has been definitely ascertained to be free from oxygen, being only the second solid non-oxidized alkaloid known, and a closely allied bark, having a similar reputation in tropical Africa, has yielded an alkaloid that is either identical with, or a homologue of conessine. From "kava-kava" (*Piper methysticum*) Dr. LEWIN has separated two resins, one of which is said to act powerfully as a local anæsthetic, and a similar property is claimed by Dr. REID for "drumine" an alkaloid separated from *Euphorbium Drummondii*. From the well-known "wisteria" plant a glucoside and a resin have been separated that appear to possess toxic properties. *Acorus Calamus* has yielded "acorin," an interesting glucoside that splits up into essential oil of calamus and sugar, as well as "calamine," an alkaloid. A species of *Lycopodium*, *L. Saussurus*, has yielded an

alkaloid that is said to possess powerful emetic and cathartic properties. "Tumbeki," a narcotic leaf used for smoking purposes that has remained hitherto an unidentified article of Persian and Turkish commerce, has been referred by Mr. HOLMES with great probability to *Nicotiana persica*, and some samples examined by Messrs. EASTES and INCE gave indications of containing from 2·046 to 5·835 per cent. of nicotine. Last, but probably not least in importance, Dr. PECKOLT has separated from cassava root—the source of tapioca—among other compounds one that on account of its powerfully antiseptic action he has named "sepsicolytin," which probably plays an important part in the West Indian "casareep" or "pepper pot." In addition to the foregoing the comprehensive report that has appeared in this Journal on the Colonial and Indian Exhibition has disclosed an almost indefinite number of vegetable substances that appear to deserve chemical and therapeutical investigation.

A number of other preparations have been described in the course of the past year, some of which may eventually take a place among the official remedies. A most interesting note on the preservation of ethyl nitrite, read by Mr. JOHN WILLIAMS before the Pharmaceutical Conference, showed how this important constituent of a most unstable preparation can be preserved in a concentrated condition in a mixture of glycerine and alcohol. Lactate of morphine has also been described by Mr. D. B. DOTT, and oleate of quinine by Mr. ROTHER. It would, however, be impracticable to enumerate all the articles that have been advocated as remedies one way or another during the last twelve months, some of them for the first time, others as revivals or old friends put to new uses. Beyond those that have already been mentioned it must suffice just to refer to the following. Two new aluminium compounds, described as an aceto-tartrate and an aceto-glycerinate have been recommended as astringent caustics. In consequence of the inconveniences attending the administration of osmic acid the potassium salt has been proposed as a substitute. Ammonium and iron fluorides have been reported on favourably in the treatment of splenic disorders. Bismuth and zinc salicylates have been in some demand, and bismuth nitrosalicylate has been added to the list of rivals to digitalis. Resorcin has been spoken of very favourably in the treatment of eczema and lupus. A compound of atropine and santonic acid has been recommended as possessing advantages in ophthalmic practice. Hydrated zinc sulphide has been spoken of as a convenient salt when it is desired to provide for a slow evolution of sulphuretted hydrogen, and, lastly, the use of medicated gases as therapeutic agents has been advocated.

Cinchona bark and the cinchona alkaloids have once more been the subject of a number of important communications. The controversy raised by the publication by Dr. DE VRIJ of inferences drawn from results obtained in the application of the polarimetric test to commercial samples of quinine sulphate has been prolonged through the year. The announcement that such samples frequently contained considerable quantities of cinchonidine was by no means an addition to previously existing knowledge, since the same fact, and the equally important one that the presence of such alkaloids was not inconsistent with official tests for the purity of quinine sulphate, had been made known long before at an evening meeting of the Pharmaceutical Society. But the attempt of Dr. DE VRIJ to set up a standard of absolute purity has led to a criticism of his methods and their defence profitable to the advance of science. Thus Dr. HESSE in pursuing his investigation found that quinine from different sources, when absolutely free from cinchonidine, did not always give the same polarimetric indications, and in fact with one sample he succeeded in obtaining a reading so much higher than the standard set by himself or by anyone else that he formally gave up the use of the optical test he had previously recommended. Subsequently he announced that one of the disturbing influences was the almost universal presence of hydroquinine, an alkaloid—hardly heard of before—closely resembling quinine in chemical properties, but having a rotatory power intermediate between quinine and cinchonidine. Professing to defer to prejudice against the optical test, Dr. DE VRIJ then reported the result of the testing of a sample of Dr. HESSE's make by the bisulphate method, which was somewhat less unfavourable. This led to an assault upon the bisulphate method, which according to Dr. HESSE is invalidated by the occurrence of a considerable proportion of quinine in the separated substance assumed to be cinchonidine. It cannot be supposed, however, that the last word has been said upon this point. In addition, Dr. DE VRIJ has recently introduced a new test for the purity of quinine, based upon the relative insolubility of the chromate of that alkaloid. Dr. HESSE, on his part, has prepared and described a number of the salts of cupreine, the peculiar alkaloid of cuprea bark discovered by Dr. PAUL. An interesting paper by Mr. HOOPER, upon the effect of age in the development of alkaloid in cinchona trees, seemed to show that the maximum richness in succirubra and Ledger trees is attained in about six years, that the limit when the shaving process exercises a beneficial effect is reached soon after, and that the application of manure is less useful to old trees than to younger ones. These results, however, may be affected by the uncertainty appertaining to the optical method of determining the amounts of the alkaloid.

In other departments of pure and applied chemistry where compounds more or less interesting to pharmacists are dealt with some very remarkable work has been done. The first place must be given to the synthesis of coniine, which appears to have

been really accomplished at last by Professor Ladenburg. It is not a little interesting that the chemical product was originally optically inert, but was successfully split up into a portion corresponding in rotation to natural coniine and a portion rotating polarized light in the opposite direction. It may be mentioned here, also, that a dextrogyre compound that appears to be the counterpart to the lævogyre asparagin already known has been met with. Next comes the practical application of methods for converting morphine into the higher-priced codeine. The synthetical manufacture of salicylic acid also has been improved so as to give a much larger yield from the same materials. Of somewhat less practical interest has been the discovery of a new element, germanium, whilst several others have been claimed, including one that has been named austrium. Another element, fluorine, is reported to have been isolated for the first time by an electrolytic process.

The pathological importance of the occurrence of some of the lowest forms of organized life is now so well recognized in methods for the prevention and cure of disease, that the subject has become of great interest to the pharmacist, and, indeed, may at some future time widely influence the practice of his calling. In regard to the interest excited, the first place must be accorded to Professor Pasteur's prophylactic treatment of hydrophobia, which has attracted patients to Paris by hundreds during the past year. Some interesting investigations on the occurrence, persistence and effects of microbes in water and the atmosphere have been published, and Dr. Klein has pleaded for a more rigorous application of scientific precautions in conducting such researches. A remarkable paper has also been published by Dr. Vaughan, explanatory of numerous reported cases of poisoning by ice creams, which he attributes to the development in the milk by an obscure fermentation of a powerful poison that he has named "tyrotoxicon." The subject has also been approached from the chemical side, and Mr. A. J. Brown has studied the chemical action of pure cultivations of *Bacterium Aceti*, and ascertained among other things that it is without action upon pure solutions of cane and milk sugar, starch, and methylic and butylic alcohols. He has also found that another species, *B. xylinum*, better known as the "vinegar plant," contains cellulose, which it must develop at the expense of carbohydrates decomposed by it, the formation of gluconic acid being probably an intermediate stage. Other important problems have also been attacked, such as the influence of certain medicines on the action of the physiological ferments, and the extent to which micro-organisms are affected by sunlight. Attention has also been drawn to the necessity for precautions to prevent the development of such organisms in solutions intended for administration hypodermically.

The past year has been unenviably notable for the number of quasi-scientific statements put forward in respect to medicinal substances that have been challenged, and about which perhaps the most charitable remark to make is that as yet they are "not proven." Early in the year it was announced by a French chemist that a substance then being supplied at a relatively high price, under the name of "hopeine," as a narcotic principle extracted from the hop, presented most of the characteristics of morphine. This was subsequently confirmed by other experimenters, and at the evening meeting in April Dr. Paul was able to announce that not only did a sample of this alleged product from "Arizona wild hops" contain an alkaloid that could not be distinguished from morphine, hitherto supposed to be yielded only by the opium poppy, but also an admixture of another alkaloid that could not be distinguished from cocaine. The individuality of "hopeine"—or, as it has also been since called, "morphine of hops"—has been strenuously insisted upon by the "discoverer," but no one else appears to be able to extract such a substance from hops from Arizona or anywhere else. The discovery of a method of producing quinine artificially at an extremely low cost has also been announced, and if confirmed would no doubt be of great chemical, if not commercial, interest. Considerable reticence has, however, been manifested as to the process, and practically all that is known is that some specimens of quinine sulphate supplied as having been produced artificially have been alleged to present the peculiarity of being contaminated by impurities corresponding in their properties to those of the alkaloids accompanying quinine in cinchona bark. Lastly, a substance largely advertised in the United States as a substistitute for quinine, under the name of "kaskine," has in Dr. Hoffmann's hands simulated the appearance of finely powdered sugar; but, notwithstanding the announcement of this experience, a "new quinine" has been largely advertised in this country recently under the same name.

The newly-appointed reporter to the Pharmacopœia Committee is not likely to complain of lack of material for his first annual report, since the year has been productive of a fair number of literary criticisms of the official preparations and processes. Of these, ipecacuanha wine has perhaps been the subject of the greatest number, but nevertheless it may be said to have stood the ordeal well, and established its position as an improvement on its predecessor. Evidently some of the loudest complaints were based on inconveniences resulting from unfamiliarity with the new official process, and possibly, in many cases, consequent minute deviations from it. It seems to be admitted, however, that although the new preparation keeps better than the old one, it still deposits more or less, and this has been attributed variously to the oxidation of ipecacuanhic acid and to the action of tannin contained in the sherry. Taking the former view, Mr. Boa is inclined to look to the preservative influence of sugar, whilst

Mr. Maben would find a remedy in the precipitation of tannin from the sherry before using it. Recognizing both causes as possible factors in the deposit, Mr. A. W. Shenstone has suggested the abandonment of the sherry in favour of an acidulated mixture of spirit, glycerine and water. Mr. Wells has reported that by dissolving an alcoholic extract, instead of one prepared with acetic acid and water, in sherry acidulated with citric or tartaric acid, a preparation is obtained that remains permanently clear. Another defect that has been made apparent is the wide range in the amount of extract obtained by different operators, one person giving the average yield at 84 grains from the ounce of root and another at 119 grains. It may be that the smaller quantity of extract contained practically as much alkaloid as the larger, but this would hardly be a safe assumption, and moreover, if the alkaloid were the only ingredient that had to be considered a solution of emetine would be the simpler preparation. But Mr. Boa calls attention to the fact that, as it is, the new preparation does not froth so much as the old one, and may be deficient in some saponin-like constituent, such as is known to occur in other expectorants, like senega root and quillaia bark. It may be added that Mr. Wells speaks of the occurrence of a frothing substance in the preparation above referred to, but implies that its disappearance is coincident with a separation of acid tartrate of potassium. Besides the effect of divergences in the way of operating, of course variations in the quality of different samples of root are indisputably a disturbing element, and should it be thought desirable to introduce into a future edition of the Pharmacopœia a process for approximate standardization possibly the observations recorded in a paper read by Mr. W. H. Jones before the Conference might be utilized.

The altered official formula for linimentum terebinthinæ has been as provocative of conflicting opinions as it appears to be prolific in diversity of products, which have been reported as ranging from thin more or less permanent emulsions to solid jellies. This variety in results has been referred with equal confidence to peculiarity in the turpentine used, the quality of the soft soap, the quantity of the water and the method of manipulation. The discussion has been so far useful as to make it apparent that the method of manipulation has at least an important influence on the final form of the product. But since some uncertainty exists at present as to what this should be, an authoritative statement on the point has been asked for in order that available experience may be utilized in providing for uniformity in this preparation. Linimentum potasii iodidi c. sapone is another preparation that has undergone some alteration, and the testimony of correspondents is that with care in the manipulation there should now be no difficulty in obtaining a satisfactory product.

The new formula for belladonna liniment has been criticized from a manufacturer's point of view by Mr. Ransom, who would use a coarser powder, and economize spirit by shortening the percolation and pressing the marc. He has also reported that the uniformity of the products is affected by the fact that the roots richest in alkaloid are the most readily exhausted, and he therefore favours this liniment being added to the list of standardized preparations, a step for which the work done by himself in association with Professor Dunstan paves the way. On the other hand, Mr. Martin has expressed an opinion that the provision that has been made for ensuring uniformity of alkaloidal strength in preparations of nux vomica fails to secure the object intended. The official process for testing elaterium has also been criticized adversly by Messrs. Jones and Ransom.

In addition to the foregoing comments upon Pharmacopœia articles, the official test for the purity of ether has been criticized by Mr. Werner; Mr. Green has pointed out that liquor morphinæ bimeconatis will sometimes require filtration, and that care must be taken not to use a filter paper containing iron; Mr. MacEwan has condemned the process for making liquor bismuthi citratis, on the ground that the official bismuth citrate is not completely soluble in ammonia; Mr. Rother has objected to the addition of glycerine to tincture of kino, and stated that gelatinization is preventible by an admixture of catechu; Mr. Seward has suggested still another formula for spiritus ammoniæ aromaticus, and Mr. Gravill has recommended the application of Allen's nitrometer to the estimation of carbonate of ammonia in that preparation.

It is satisfactory to note that pharmacists are utilizing their scientific attainments in testing the genuineness of samples of the materia medica that pass through their hands. As instances of a high order of this class of work may be mentioned the histological papers by Messrs. Petersen and Kirkby on "sandal woods" and a paper by Mr. Kirkby on a false pareira brava from West Africa. In view too of the increasing use of sandal wood oil Mr. Holmes did useful service by summarizing the botanical origin of the different "sandal woods" met with, and the oils that are represented to be derived from them. Mr. Holmes has also recorded the appearance in the market under the name of "rhatany" of a root probably not derived from any species of *Krameria*, but nevertheless containing a fair quantity of tannin. The fruit of *Daphnidium Cubeba*, the spurious cubebs met with in commerce several times during the last two or three years, has been the subject of a chemical investigation by Messrs. Braithwaite and Farr, and if they be correct in stating that it contains two alkaloids soluble in ether this would appear to afford a convenient means of recognizing its substitution or admixture. Professor Maisch has contributed an exhaustive summary of the varieties of saffron and the sophistications to which they are subjected

Lupulin has now a place in the Pharmacopœia, with a maximum limit of 15 per cent. of ash; but the ash yielded by four samples examined by Mr. J. S. Ward ranged from 27 to 31 per cent. Cream of tartar has been the subject of an inquiry by Mr. J. W. Bostock, who found only twenty out of twenty-six commercial samples to answer to the requirements of the Pharmacopœia. In the hands of Mr. Alcock samples of citrate of iron and quinine also gave an unfavourable result, only one out of six commercial samples coming up to the standard of containing 15 per cent. of alkaloid, and even this, as well as other samples, giving indications of having been prepared direct from quinine sulphate. Further, in some interesting "analytical notes," read before the Chemists' Assistants' Association, Mr. Burnett gave some reasons for thinking that prescribers are warranted in a preference for natural over artificial salicylic acid, and mentioned that it was not advisable to use pharmaceutically any bismuth compounds that turn a wrapping paper pink.

An inevitable part of such a task as that which is now drawing to a close is to allude briefly to men who during the twelvemonth have been lost by death to pharmacy and science. The Pharmaceutical Society has lost several members from whom it had received good and faithful service. Among these may be mentioned Mr. Henry Sugden Evans, a former President of the Society; Mr. James Baynes, of Hull, a former member of Council; Mr. William Southall, of Birmingham, for many years an esteemed member of the Board of Examiners and at one time President of the Pharmaceutical Conference; Dr. Frederic John Farre, more than thirty years an honorary member; Mr. William Henry Baigent, one of two surviving associates of 1842 and a repeated benefactor to the Benevolent Fund; and Mr. James Stannes, of Tavistock, under whose testamentary dispositions the Benevolent Fund will eventually benefit to a considerable extent. In addition death has removed Mr. Philip Williams, of Horsham; Mr. Henry Goodall, of Derby; Mr. R. Walker, of Maidenhead; Mr. A. Sapp, of Basingstoke, and Mr. Henry Davis, of Leamington, all of whom have served the Society as Local Secretaries. In Professor Morris, the eminent geologist, one of the earlier members of the Society passed away. Abroad among the names that were familiar to British pharmacists were Professor Bouchardat, of Paris, Professor Wayne, of Cincinnati, and Mr. Moens, the eminent Dutch quinologist.

The next meeting of the School of Pharmacy Students' Association will be held on Thursday, January 6, when a paper on "Nitrification, or the Formation of Nitrates in Nature," by Miss E. A. Munro, will be read, and Mr. E. H. Farr will make a Report on Materia Medica.

* * *

A meeting of the London Section of the Society of Chemical Industry will be held on Monday next, at Burlington House, when a paper on "The Explosive Kinetite," by Mr. Watson Smith, will be read.

Parliamentary and Law Proceedings.

Prosecutions under the Sale of Food and Drugs Act.

At the Town Hall, Sheffield, on Wednesday, Dec. 22, before the Stipendiary (Mr. E. M. E. Welby), Mr. George Bywater, druggist, of 215, Arundel Street, was summoned under the Sale of Food and Drugs Act, at the instance of the Health Committee, for having sold tincture of opium which was not of the nature, substance, and quality of the article demanded.

Mr. H. Sayer, Deputy-Town Clerk, prosecuted.

Dr. Sinclair White, Medical Officer of Health, proved that he personally purchased at the defendant's shop three ounces of tincture of opium. The sample was duly divided, and a portion submitted to the Borough Analyst, Mr. A. H. Allen, who certified that the proportion of opium in the sample was less than one-third of that contained in the tincture of opium of the British Pharmacopœia, while the proportion of alcohol was somewhat more than one-half the proper quantity. The facts were admitted by the defendant, who stated that he purchased and sold the tincture as of British Pharmacopœia quality.

Dr. White, Mr. Allen, and Mr. G. T. Wilkinson-Newsholme, President of the Sheffield Pharmaceutical and Chemical Society, all gave evidence to the effect that only one tincture of opium was recognized by pharmacists or the public, and that an article sold as tincture of opium ought to be the British Pharmacopœia tincture.

The Stipendiary said that no doubt the action of the Health Committee was very laudable, but he was of opinion that if a preparation contained any opium and any alcohol whatever it could legally be sold as tincture of opium.

The case was dismissed.

Mr. Joseph Sanderson, of 220, Nottingham Street, shopkeeper, was summoned under the same Act for having sold paregoric elixir, which, according to the certificate of the Borough Analyst, was "wholly destitute of opium, which was the most important ingredient of paregoric elixir."

Mr. Allen, Dr. White and Mr. Newsholme again gave evidence in support of the prosecution, and adduced various authorities to show that opium was an essential ingredient of paregoric.

Mr. Allen stated that the existence of paregoric without opium was as impossible as that of whisky without alcohol. If the preparation had no opium in it, it had no right to be called or sold as paregoric.

For the defence, Mr. A. Muir Wilson called Mr. J. T. Leslie, who represented his brother, a druggist in Trippet Lane, who had supplied the defendant with the preparation in question. It was shown that the bottle out of which the inspector was served was labelled "Paregoric Elixir, guaranteed free from opium," but the attention of the purchaser was not called to the label until after the purchase was completed.

Mr. Leslie said that he supplied shopkeepers with the article complained of, so that they might not infringe the Pharmacy Act, they having no licence to sell poisons. He could not name any ingredient of a medicinal value that the paregoric without opium supplied by him contained.

The Stipendiary said that the name "paregoric" failed to give him any definite impression any more than soothing syrup.

Mr. Sayer pointed out that, for all the defence amounted to, they might simply sell coloured water, and call it paregoric.

The Stipendiary said he did not see that the law prevented it, and dismissed the case.

Mr. Sayer stated that there were several other cases of a similar nature, but in consequence of the ruling of

the Stipendiary, he applied for them to be adjourned in order that the instructions of the Health Committee might be taken with regard thereto.

The cases were adjourned accordingly.

Obituary.

Notice has been received of the death of the following:—

On the 24th of November, Mr. William Parrington, Chemist and Druggist, Batley. Aged 44 years. Mr. Parrington had been a Member of the Pharmaceutical Society since 1877.

On the 8th of December, Mr. Samuel Royle, Chemist and Druggist, Manchester. Aged 53 years.

On the 9th of December, Mr. Henry Thorburn, Chemist and Druggist, Bishop Auckland. Aged 73 years.

On the 16th of December, Mr. William Houghton, Pharmaceutical Chemist, Southport. Aged 53 years. Mr. Houghton had been a Member of the Pharmaceutical Society since 1859.

On the 18th of December, Mr. Joseph Abbey, Chemist and Druggist, Nottingham. Aged 50 years.

On the 22nd of December, Mr. Samuel Thomas Sedgwick, Chemist and Druggist, Bexley Heath. Aged 66 years.

On the 28th of December, Mr. James Marwood Hucklebridge, Pharmaceutical Chemist, Ebury Street, London. Aged 69 years. Mr. Hucklebridge was one of the Founders of the Pharmaceutical Society.

On the 25th of December, Mr. George Atkinson, Aldersgate Street, London. Aged 51 years.

On the 27th of December, Mr. George Frederick Hodgkinson, Waddon. Aged 69 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Sheffield Drug Prosecutions.

Sir,—In the interests of chemists generally I think it only fair to draw attention to the enclosed cuttings* from the *Sheffield Daily Telegraph*, referring to the prosecutions for the sale of adulterated drugs. As one of those present in court, I can testify that the reports are not in the least exaggerated, but, on the contrary, somewhat underdrawn. I wish particularly to emphasize the way in which the Bench ignored the British Pharmacopœia, and to ask whether in view of the 15th section of the Pharmacy Act, 1868, this conduct is legal? The clause runs thus:—"Any person . . . . . who shall compound any medicines of the British Pharmacopœia except according to the formularies of the said British Pharmacopœia shall, for every such offence, be liable to pay a penalty or sum of £5." The point at issue is this: Is the title "tincture of opium," without the addition of the letters "B.P.," legally understood to mean a "medicine of the British Pharmacopœia?" You will note that the defendant admitted having (bought and) sold the tincture as a B.P. preparation. Moreover, the proceedings were taken under the "Sale of Food and Drugs Act." If this is not a case of *bonâ fide* adulteration, what is the adulteration of a drug to mean? Again, the British Pharmacopœia is published in accordance with the Medical Act, 1858, which enacts that a book shall be "published containing a list of medicines and their compounds, and the manner of preparing them, together with the true weights and measures by which they are to be prepared and mixed . . . . . " If these medicines can now be prepared according to any formula or whim which an individual, intent on money making by fair means or foul, may devise, whence the use of this enactment? Once more, the effects of such a precedent as this will be bound to be, that in the face of competition the orthodox pharmacist will cease to make his tinctures with spirit of proof or rectified strength, but will use weaker spirits in each case to lessen the cost, and the result will be inferior solution of active constituents and deterioration of products.

In the second case, the analyst reported absence of opium from the paregoric. As stated by the Town Clerk in his opening remarks, the case was instituted with a view of putting down the growing practice of supplying grocers with paregoric *sine* opium for the purpose of allowing them to sell it without transgressing the Pharmacy Act. The defence was that there were known two varieties of paregoric, one with, and the other without opium; the one with for chemists to sell, the one without for anyone to sell. As was pointed out in court, this is quite contrary to time-honoured custom and usage, and the practice, if not suppressed, will lead to dangerous instances of customers getting into the habit of taking the one, then on being supplied from a chemist with the true article taking the same dose (or more likely administering it to children), and thereby producing opium poisoning.

As both of these cases are of burning interest to pharmacists generally, I thought it very desirable that the question should be thoroughly ventilated. It ought to be settled definitely whether the British Pharmacopœia is a legal authority or only a guide to be followed at pleasure.

294, *Uxbridge Road, W.* Jos. F. Burnett, F.C.S.

* A report of the cases will be found on p. 543.

Special Preparations.

Sir,—If anything could illustrate the folly and inconvenience of medical men prescribing "special preparations," the following case, which occurred to me to-day, surely does so. A woman, who had had a miscarriage, sent up by the hands of a child a prescription for two draughts, each containing 1 drachm of "liq. ergotæ ammon." The maker's name was not stated; I did not know the prescriber or where he lived, and I failed to obtain the preparation at any of the neighbouring chemists. Under such circumstances what was the correct thing to do? I presume that had I known the maker I should have had to get either a 4 ounce, or perhaps an 8 ounce bottle just to dispense 2 drachms, the remainder being put away, never probably to be wanted again. Does this sort of thing pay the chemist? It may be all very well for the medical man who dispenses his own medicines.

Pharmacist.

Aconitum Napellus.

Sir,—It is considered that a considerable portion of what is sold as *Aconitum Napellus* is not true to name, and that some at least of these substitutions contain little or no aconitine. It is most desirable that this most important question should be settled. Any pharmacists who grow aconite will confer a favour if they will furnish me with roots to grow, as Mr. Holmes informs me it is only in the young leaf state that *A. Napellus* can be identified.

31, *London Street, Norwich.* Octavius Corder.

A Suggestion.

Sir,—Being in want of a silicated box to post an ointment in, and finding I was not possessed of one of the size required, I bethought me of a substitute, which was as follows.

I took an ordinary turned wood box of the size required and coated the interior twice with a solution of sandarac in absolute alcohol 1 in 2, and am glad to say it answered perfectly.

Serous.

"*Metabolism.*"—We think your criticism is somewhat harsh, considering that the paper was only presented as a report. We will nevertheless, if you wish it, pass on your communication to the reporter.

Assistant.—The preparation of the old London Pharmacopœia is now little used, but a solution of carbonate of ammonia is usually supplied when asked for under that name.

Doubting Thomas.—We are not aware that any analysis of the nostrum referred to has been made.

Communications, Letters, etc., have been received from Messrs. Hustwick, Armstrong, Whelphy, Davies, Elborne, D. A. F., W. J. B.

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Methylated Spirit & Finish, 64 O.P.

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A good sound wine, combining body and strength, and specially adapted for medicated wines and other purposes.

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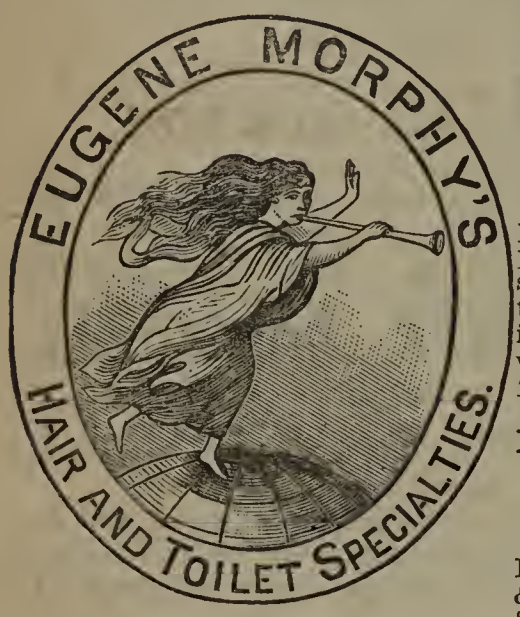

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AS USED IN ALL THE GOVERNMENT MUSEUMS.

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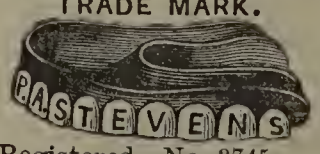

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10½	,,	2½	,,	4/-	10½	,,	3	,,	4/6
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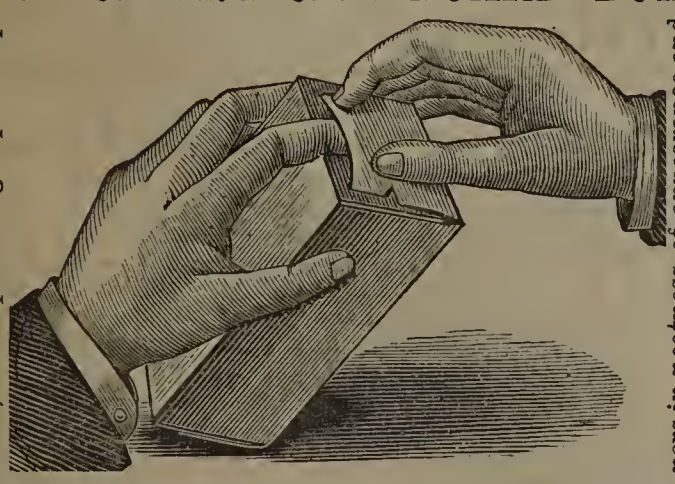

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Manufacturing Homœopathic Chemists

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Illustrated Prospectus and Trade Lists forwarded post free.

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Plain Black Currant, old square	...	...	2*s* 6*d*
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(* Ipecac. and Morph., strength as "B. P.")

In Bottles, 1 lb., 2 lbs., 4 lbs., and 7 lbs. For Exportation, in soldered tins, of any size. From EDWARDS, London; through any Wholesale House; and from the Manufacturers,

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Who will forward Samples by post on application. Also, BROWN COUGH LOZENGES, 2s.; 7 lbs. stamped with name free, and MUSK LOZENGES (Special), 2s. 6d. *N.B.—Medical Lozenges of every kind*, including those of the Pharmacopœia of the Hospital for Diseases of the Throat, London.

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Who offer the same in tins and casks, and can supply best Rectified Spirits of Wine in quantities of two galls. and upwards.

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The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

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BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

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Prospectus and samples free on application.

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(COX'S PATENT.)

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We strongly recommend our Aperient Pills at 6s., Compound Rhubarb at 6s., and Pil. Cochiæ at 5s. per pound, coated, as saleable Pills. These, or any Pills in our list, are sent out to every part of the United Kingdom in half-pound parcels, package, postage, and carriage free, on the same day as the order is received; and, to avoid booking and other expenses, 1d. in the Shilling will be allowed if Stamps or P.O.O. are remitted with order.

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Beds 1s. 6d. to 2s. 6d., Plain Breakfast or Tea 1s. 3d. This old-established house is most centrally situated, about midway between the City and West-end, near to the chief railway stations and places of amusement, within five minutes walk of great thoroughfares and lines of omnibusses, and being in a square is very quiet and open. The house is most home-like, and highly satisfactory testimonials may be had on application.

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SHEEP OINTMENT,
MADE BY STEAM POWER,

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Chemists, Druggists, and Patent Medicine Vendors

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CONSTITUTION BALLS

free of cost by Parcels Post, with a 3/6 Packet of Balls towards paying for distribution.

To prevent error send card of address to
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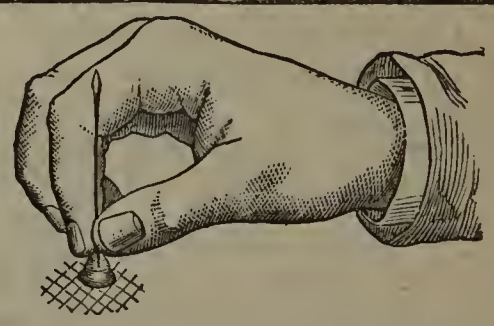

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SOLE AGENTS FOR

Dr. WARLOMONT'S CALF VACCINE.

Tubes, 2s. each. Half Tubes, 1s. each. Pomade in vials, 5s. HUMAN VACCINE, from healthy children only, microscopically examined and source quoted.—Three tubes, two-thirds full, 5s.; Tubes, one-third full, and Lancet Charged Points, 1s. each; Pin-points, 1s. 1d. each. Eighteen Charged Small Points, 5s.

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VACCINATIONS DAILY, between the hours of 12 *and* 2, *by the Consulting Physician, at the uniform fee of a Guinea.*

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P.O.O.'s (including postage, and crossed London & Westminster Bank), with orders, payable to EDWARD DARKE, *Secretary.*

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Laboratory and School Buildings:

173, MARYLEBONE ROAD, N.W.

The following Students of this School were successful in passing their Examinations in December :—

MAJORS.

Mr. J. F. Fleetcroft.
„ W. Musselwhite.

MINORS.

Mr. H. T. Doble
„ E. M. Evans
„ W. E. Everett
„ G. A. Hunter
„ J. F. Kingzett
„ H. L. Osmond
„ C. J. Palmer
„ W. J. I. Philp
Mr. W. G. Poll
„ J. J. Thomas
„ L. W. Stanton
„ W. O. H. Tonking
„ H. N. Wakeham
„ J. W. Webber
„ F. A. Willcock
„ J. L. Williams

Mr. S. W. Woolley.

The next Course of Lectures commences on Monday next. For Prospectus apply to Mr. John Woodland.

"CONCILIO ET LABORE."

THE

Manchester College

OF

PHARMACY,

225 & 227a, OXFORD ST., MANCHESTER.

The next Session will begin on Monday, January 3 1887. *Full particulars of the Classes, Fees, &c. (which are inclusive), will be sent on application.*

It may be marked in reference to the many schemes of work now being advocated that the arrangement of the Afternoon, Evening, and Once-a-week Classes given in the Prospectus for the present (and of past sessions) is almost identical with that given in the scheme now much in favour; while the "Class System" which Mr. Turner has so long worked on has the approval of one of the leaders of Pharmacy whose speech attracted so much notice a few weeks ago; and, finally, a **Year's Fee** to any one of these Courses of Classes is only **£8 8s.**—well within the means of the generality of Pharmaceutical Students.

PRIVATE TUTOR

Mr. JAS. W. SAUNDERS
(from the Royal School of Mines),
6, ROCHESTER SQUARE, CAMDEN ROAD, N.W.

At the **October** Minor **Six** of my Pupils presented themselves. **Four** passed. **Four** at the Preliminary. **Three** passed. Private and Postal tuition only. No classes or demonstrators.

LABORATORY CLOSE TO GOWER STREET STATION.

Laboratories and School Buildings:
TRINITY SQUARE, BOROUGH, S.E.

Lecturers—
Mr. G. WILLS, F.L.S., F.R.M.S., &c.
Mr. H. WOOTTON, F.R.H.S., &c.
Mr. W. W. WILL, F.C.S., &c.
Mr. A. D. MARKHAM, M.P.S.,
Medallist of the Pharmaceutical Society.
Mr. J. E. WALDEN.

The next Course of Lectures will commence on Monday, Jan. 3, 1887.

Students intending to enter on the above date should send in their names as early as possible, as there are only a few vacancies.

FEES. { **Feb. Exam., £6 6s. April Exam., £9 9s.**
12 Months' Course (Minor and Major), £15 15s.

By attending this College Students may be sure of receiving a thorough Pharmaceutical education, as well as being efficiently prepared for their respective examinations.

Extra Special Classes will be held for those students who wish to present themselves in February.

The following students of the Westminster College were successful in passing their Examinations this month:—

MAJOR.

One Student only presented himself and passed.
Mr. C. B. Gilson.

MINOR.

Mr. G. W. Barratt
„ W. H. Burrell
„ G. W. Blankley
„ J. F. Cole
„ H. W. Day
Mr. J. W. Hickinbottom
„ J. Hunter
„ S. C. Moyle
„ E. J. Northey
„ J. Park

Mr. F. P. Watson

APOTHECARIES' HALL.

Mr. A. E. Beardmore
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Are held daily.
FEE—ONE GUINEA PER MONTH.

Evening Classes & Laboratory Instruction

Every Tuesday, Thursday and Friday, from 7 till 9.
Minor, Three Months, **£1 1s.** **Preliminary, 15s.**
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"SYSTEMA OMNIA VINCIT."

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Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

ESTABLISHED 1ST OCTOBER, 1868.

THE NINETEENTH SESSION, 1886-7.

The next term will commence on the 10th January, 1887.

For Fees, &c., apply to W. BAXTER, Secretary.

PRELIMINARY & MINOR.

ALL Students who are preparing should send for particulars of a method of study which will enable them to pass with ease. Enclose stamped envelope to Mr. J. TULLY (Hills Prizeman), Chemist, Hastings. Established 1872. References to past and present Pupils. **32** Pupils passed the last Examinations.

BOARD and Residence offered on moderate terms to a student at Bloomsbury Sq. Comfortable home and congenial society. Quiet neighbourhood, half an hour from the Square. Apply to Mr. VERNON, Pharmaceutical Chemist, 72, Aubert Park, Highbury, N.

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IMPROVER or JUNIOR, in a good establishment. Two or more kept. 5 years' experience. R. S., Station Rd., March.

AS ASSISTANT or MANAGER. Accustomed to first-class business. Retail, Dispensing and Prescribing. Good testimonials from all previous situations. Qualified. Married. Can furnish premises if required to reside at shop. ALPHA, Brampton House, Havelock Rd., Shrewsbury.

ASSISTANT or part-time. London. Age 25. STUDENT, 100, Eign Rd., Hereford.

JUNIOR in good Dispensing business. Age nearly 20. Height 5ft. 6in. Over 5 years' experience. Excellent references. D. T. MORRIS, Bush Villa, Pontardulais.

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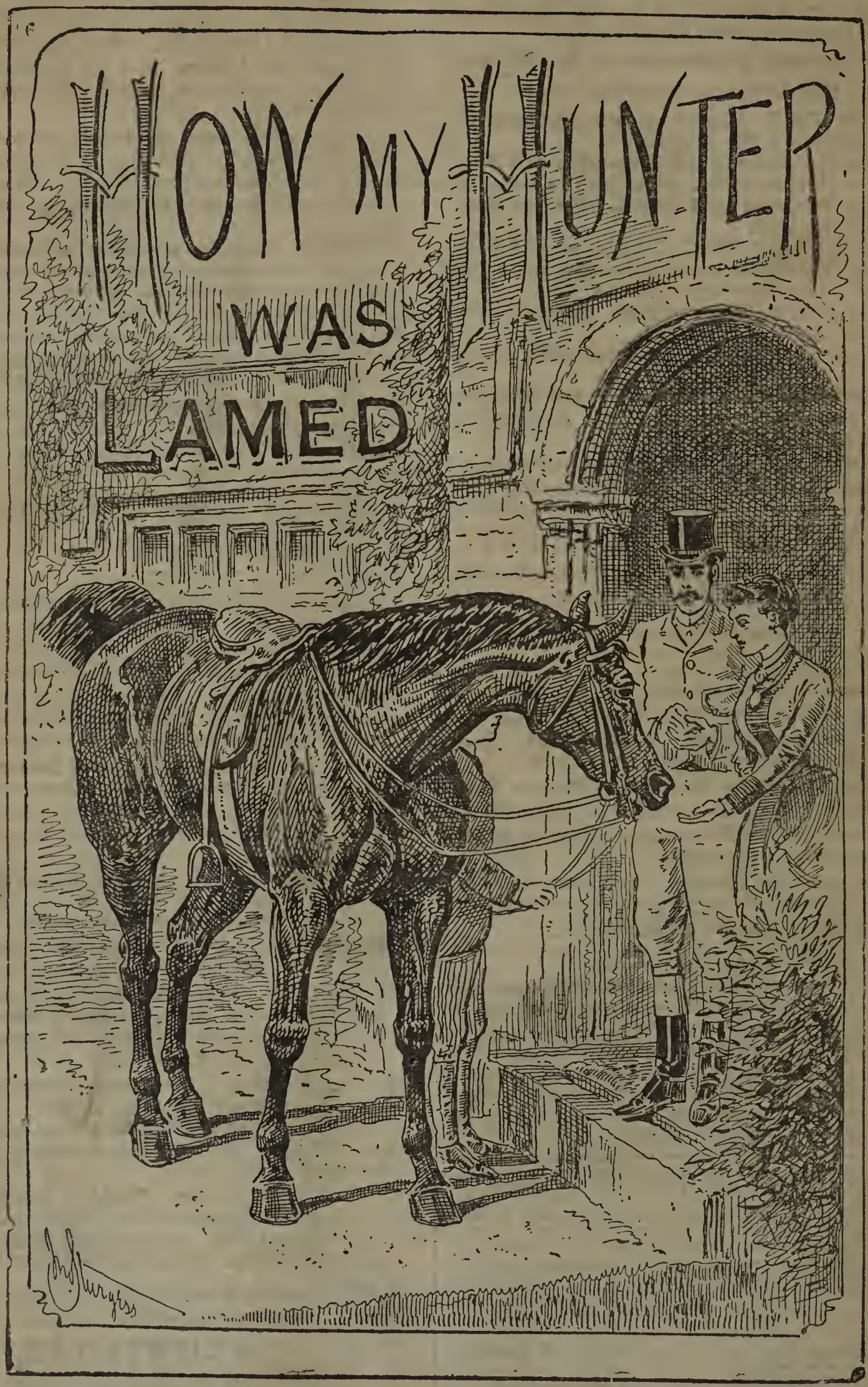

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The Pharmaceutical Journal AND Transactions.

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The chair will be taken at Eight *precisely*.

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Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, February 2nd, as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

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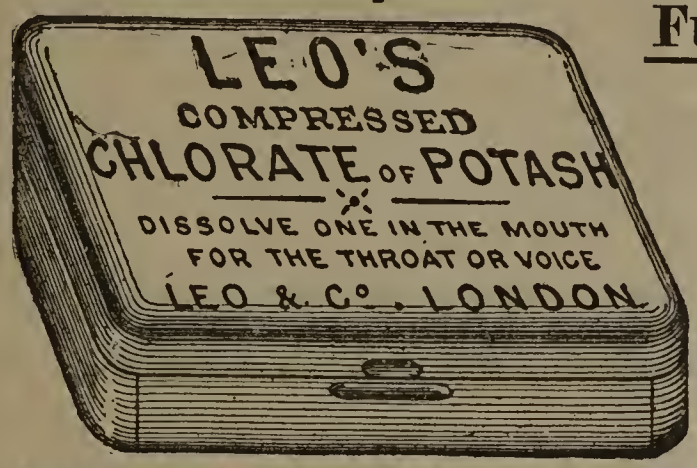

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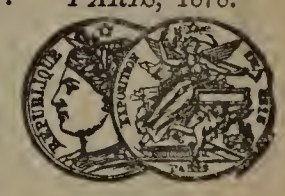

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SPECIAL PRICES ON APPLICATION.

EXPERIMENTS ON THE GELATINIZING CHARACTER OF CRYPTOPIA.

BY T. AND H. SMITH, EDINBURGH.

The following experiments were made by us in consequence of a statement made by Mr. Dott in a paper communicated by him, and published in the Journal of January 26, 1884, page 581.* They would have been published at the time but the notes were mislaid. They seem to us, however, of sufficient interest to be submitted to the readers of the Journal.

1. As a standard of comparison, a 2 per cent. solution of gelatine, which may be considered as the type of gelatinization, was prepared; it formed, on cooling and standing for a short time, a jelly.

2. A solution of cryptopia made with water, in the proportion of 1½ part to 100 parts of water, with the addition of 1½ part hydrochloric acid. In a few hours it had set into a firm jelly, like that made with gelatine, colourless and transparent.

A disk ¾ of an inch in diameter was placed on the cryptopia jelly and a 100 grain weight laid upon it. The weight was supported without showing any tendency to sink. On the other hand, the same disk loaded with 100 grs. sank in the 2 per cent. jelly made with gelatine. Further, the cryptopia jelly was quite firm, while the other was tremulous. So that a jelly of cryptopia containing a little less than 1½ per cent. actually gives a jelly much firmer than one containing 2 parts of gelatine to 100 parts of water.

Having now a standard with which to compare narcotine for the character attributed to it by Mr. Dott, we made these further experiments.

One and a half parts of narcotine, 1½ parts of hydrochloric acid, and 100 parts of water gave a solution which presented no appearance of gelatinization. Three to 100 gave a like negative result. An increase of the quantity to 6 parts gave the same negative result. Even when the quantity of narcotine was brought to 10 and 20 parts respectively in 100 parts of water the liquids gave not the slightest appearance of either gelatinization or crystallization; for days they retained their original liquid state.

We next dissolved, with the aid of heat, 50 parts of a pure crystallized muriate of narcotine in 50 parts of water. A little of the salt remained undissolved. The solution next day had the appearance of a thick syrup, and could not be considered to have a gelatinous character; for days the solution remained in the same condition.

We now prepared a solution with 50 parts of narcotine, 50 parts of water, and 40 parts of hydrochloric acid, so that the solution should be strongly acid. This solution showed no more tendency to gelatinize than the neutral solution.

We next dissolved narcotine in an equal quantity of glacial acetic acid, and although with difficulty a perfect solution was effected, it formed a thick syrupy liquid, but not in the least gelatinous.

We next dissolved 20 parts of narcotine in 100 parts of water, with the addition of 15 parts of a 40 per cent. sulphuric acid; the result was, as in all the other cases, a solution showing no tendency to gelatinize.

One and a half parts of cryptopia dissolved in 100 parts of water acidulated with 1½ parts of a 40 per cent. sulphuric acid gave a jelly like the hydrochlorate of cryptopia of the same strength.

A very striking and interesting change takes place in the jelly of muriate of cryptopia.

If examined in a day or two after it is formed, a number of opaque white spots are observed, and these go on increasing in number and size, growing into beautiful radiated tufts of crystals, till they fill almost the entire space of the original jelly, forming to the eye a crystalline compact mass, with a thin liquid at the top.

The disk, weighing 11½ grains, used for the gelatine and cryptopia jellies, when put on the surface of the 50 per cent. solution of narcotine, sank at once to the bottom.

* The statement was that "strong solutions of hydrochloride of narcotine show a curious tendency to gelatinize, like the salts of cryptopia."

ASH OF CINCHONA BARK.

BY DAVID HOOPER,
Government Quinologist.

I have recently been engaged in examining the inorganic constituents of cinchona bark, and the analysis has been communicated to the Government of Madras for information of the cinchona planters of the Presidency. As the chemistry of this drug will always be of interest to pharmacists, I send some notes relating to the amount of ash and the quality of the ash occurring in barks cultivated in India.

In Flückiger and Hanbury's 'Pharmacographia' the following statement is made:—"The cinchona barks yield but a scanty percentage of ash, not exceeding 3 per cent., a fact well according with the small amount they contain of oxalate and kinate of calcium."

With regard to the quantity of ash, my experience is that cultivated barks yield over 3 per cent.; the average of three hundred estimations made on samples from this country was calculated at 3·42 per cent. Renewed and old natural barks are the poorer in mineral constituents, but they never fall below 2 per cent. On the other hand, young and branch bark gives as much as 4 per cent., and it is interesting to notice that the leaves afford as much as 5, and sometimes 6 per cent. With regard to the species of cinchona, there is a marked difference in the amount of ash yielded by each, provided that natural bark is operated upon. The crown bark is richer in ash than that of the red, and the red richer than that of the Ledger; and knowing that crown bark grows at an elevation of 7000 to 8000 ft., the red at 5000 to 6000 ft., and the Ledger at 3000 to 5000 ft., the altitude may have something to do with this gradation of ash in the different species.

When gently incinerated at a low red heat cinchona bark should always leave a greyish-white ash. If it is at all reddish, it points to the presence of dust or dirt adhering mechanically to the sample, if weighed, it will be found much in excess of that obtained from clean bark. The two most dirty samples of bark I have met with came from Ceylon, leaving, when burnt, a reddish residue of 18·8 and 19·5 per cent. respectively, but as they were both labelled "dust," neither the vendor would be blamed for the impurity, nor could the purchaser rave on account of its poverty in alkaloids.

A complete analysis was made of the ashes of the two species of cinchona grown on the Nilgiris, the *C*

officinalis growing in the Dodabetta plantation, and the *C. succirubra* from the lower elevation at Naduvatam. Notwithstanding the barks were from different species and localities, the result of the examination shows that there is a great similarity in the composition of the ash.

	C. officinalis.	*C. succirubra.*
Soluble in water	27·33	24·46
Soluble in acid	66·92	69·94
Residue	5·75	5·60
	100·00	100·00

	C. officinalis.	*C. succirubra.*
Insoluble silica	5·75	5·60
Soluble silica	1·42	4·40
Alumina	2·70	4·24
Iron oxide	2·85	3·21
Manganese	trace	—
Lime	32·70	32·80
Magnesia	2·07	2·52
Potash	16·35	12·49
Soda	3·40	2·28
Carbonic acid	27·22	27·77
Sulphuric acid	1·16	1·08
Phosphoric acid	3·93	3·19
Chlorine	·45	·42
	100·00	100·00

The chief constituent is the lime which forms nearly one third of the whole, and exists in the ash in the form of carbonate. The next element of importance is the potash, which amounts to one-sixth and one-eighth of the whole ash respectively.

About fourteen years ago P. Carles wrote a paper on the "Complete Analysis of Cinchona Barks," in the *Répertoire de Pharmacie* (new series), vol. i., p. 60 (which appeared in the *Pharm. Journ.*, March 15, 1873), and a complete analysis is given of the ash of Huanuco, calisaya and succirubra barks from South America. His examinations agree on the whole with the above, but he finds traces of copper and appreciable quantities of manganese present. Although there was quartz present in most of my samples, weighed as insoluble silica, yet there was no trace of copper; and the absence of more than traces of manganese is in accordance with the nature of the Nilgiri soils. I can confirm Carles in showing what a small quantity of chlorine is present. As to barks rich in quinine associated with abundance of lime salts, I cannot agree that there is any relation between the alkaloids and the mineral elements. The cinchonas of South America were poorer in quinine then than the Indian barks are now, and they yielded about half the amount of ash. On the other hand the Ledger barks, which are richer in quinine than succirubras, always contain less ash, and consequently a less amount of lime. There is not much lime in the Nilgiri soil, yet it seems an essential ingredient in cinchona bark, and is taken up in large quantities whether the cinchona is grown in India or America. However different the soils of these two countries may be, a comparison of the analyses of Mr. Carles and myself will show that cinchona bark appropriated to itself a peculiar arrangement of chemical elements. If the arrangement of the inorganic constituents of plants were at all constant it would be a means whereby the chemist could assist the botanist in discriminating between different natural orders, genera, if not species of plants.

Ootacamund, India, December 7, 1886.

BUCHU AND OIL OF BUCHU.*

BY R. SPICA,

Professor at the Royal Institute of Venice.

In 1827 Cadet de Gassicourt (*Journ. de Pharm.*, xiii., 106) found that 100 parts of buchu leaves contain 0·6 to 0·8 parts of an ethereal, yellow oil, lighter than water, 21·17 parts of gum, 5·17 parts of extractive, 1·1 parts of chlorophyll and 2·15 parts of resin. Brandes (*Arch. Pharm.*, 1827, xxiii, 229) prepared, beside the ethereal oil, etc., a glutinous, amorphous substance, soluble in water, chemically allied to colocynthin and cathartin, which he called diosmin. Bedford obtained from the leaves of *B. serratifolia*, 0·66 per cent. of volatile oil, and from *B. crenata* and *B. betulina* 1·21 per cent. Landerer (*Buchn. Repert.*, 1830, xxxiv., 63), by extraction with alcohol, found a crystalline body, insoluble in water, to which he gave, also, the name diosmin. Jones (*Pharm. J. Trans.*, 1879, ix., 673) determined the quantities of ash in the several species to be from 4 to 5·5 per cent., containing a large quantity of manganese, and, by successive treatment with solvents, ascertained that 3·8 to 5·86 per cent. was soluble in ether, 7·7 to 15·7 per cent. in alcohol and 13·9 to 22·38 per cent. in water. Wayne (*Am. Journ. Pharm.*, 1876, p. 18) found that the ethereal oil, treated with caustic soda, and then with hydrochloric acid, gave crystals, which he claimed were salicylic acid. Flückiger, whose researches (*J. Pharm.*, 1880, ii., 404, and *Pharm. J. Trans.*, 1880, No. 533, p. 219) are very important, made his experiments upon *B. betulina*, using the ethereal oil obtained from 35 kilograms of leaves (180 gm. of oil), from which he secured a solid crystalline body, fusing at 83° C., boiling at 233° C., which he called diosphenol, and ascertained the chemical formula to be $C_{14}H_{22}O_3$; also, an oil isomeric with borneol $C_{10}H_{18}O$, boiling at from 205° to 208° C. J. M. Maisch, finally, studying the ethereal oil of *B. betulina* (*Am. Journ. Pharm.*, 1881, p. 331), confirmed the data of Flückiger and disproved Wayne's statement concerning the presence of salicylic acid, which, while sometimes present, was thought to be due either to fermentation or to the presence of other leaves among the buchu examined.†

Extraction of Volatile Oil.—The leaves in a finely powdered state were distilled until no more oil passed over. The oil was lighter than water, and left, while floating upon the surface of the liquid, prismatic crystals. The aqueous distillate contained a feeble acid, whose chemical nature, together with that of the residual, strongly acid, brown liquid remaining in the retort, will be further examined. In order to obtain a larger quantity of the volatile oil, the process of extraction was modified and repeated upon more material. The powdered leaves were macerated with ether for three days, when the liquid became green in colour from dissolved chlorophyll. The larger quantity of ether was then distilled off, while the balance was evaporated, spontaneously, and the oily residue distilled with steam, until no further oil passed over. Every 1000 parts of leaves yielded about 6·5 parts of a greenish yellow oil, having a grateful odour, similar to peppermint and bergamot, and lighter than water. Separated from the water and desiccated over fused calcium chloride, a portion was fractionally distilled. The greater part passed over between from 200° to 235° C., and the last portions were manifestly decomposed and

* From the *American Journal of Pharmacy*, October.

† In the translator's opinion, if the results of Professor Spica be accepted, the more probable theory would seem to be, that salicylic acid does not pre-exist in the leaves; but since a portion or all of the elæopten and the stearopten is of phenylic origin, that that portion is decomposed, first, by the added soda, to form sodium salicylate and then, by the hydrochloric acid, to form salicylic acid, in a similar manner to oil of wintergreen, when that liquid is treated with the same reagents. Further, it is shown, that only in neutral solution does the stearopten possess its characteristic mint-like odour, and any change in this characteristic, must necessarily indicate some change in chemical composition.

gave a different and rather more phenol-like odour than the first. In order to ascertain if the first fractions contained substances soluble in potassium hydrate, a small quantity of the mixed fractions was agitated with KHO, in strong solution, after which separation into two parts took place. Using a second quantity, with a more dilute solution of KHO, it became evident that the KHO solution was not as sensibly coloured, as in the first instance. The insoluble part (elæopten) was then separated, washed with water and desiccated over fused calcium chloride, while the aqueous washings were added to the KHO solution and the remaining elæopten was removed by agitation with ether. The alkaline solution was then treated with hydrochloric acid until slightly acid, when a precipitate formed which, after several minutes, assumed a crystalline aspect. The supernatant liquid was removed and the residue agitated with ether, the ethereal solution evaporated at a low temperature, when the stearopten crystallized in the form of long, flat needles, slightly impure from adhering brown oil.

Examination of the Elæopten (*Diosmelæopten*).—It is a greenish-yellow oil of grateful odour, and constitutes about two-thirds of the volatile oil. It has a pungent, cool, aromatic, and finally, sweetish taste. Desiccated over fused calcium chloride and then distilled, it fractions very irregularly. The first fraction (*a*), very small in quantity, came over at from 180° to 200° C., the second (*b*) at from 200° to 203° C., the third, the largest in quantity, at from 203° to 206° C., the fourth (*d*) at from 206° to 209° C., the fifth (*e*) at from 209° to 211° C.; leaving in the retort a small yellowish-brown residue. Repeating the distillation, after having reunited the more abundant fraction, there was obtained a portion boiling at from 204° to 206° C. (not corrected). This fraction constitutes a perfectly colourless, mobile liquid, lighter than water, having the odour and taste before mentioned, and when subjected to ultimate analysis, gave H 12·00 and C 77·66; while the portion boiling at from 209° to 211° C. yielded H 12·19 and C 77·48. This points to the elementary formula $C_{10}H_{18}O$, isomeric with borneol, which, in 100 parts contains H 11·68 and C 77·92. The portion boiling at from 204° to 206° C. corresponds better, in its results, with this formula, while the higher boiling fractions probably contain compounds less carburetted, and inversely.

The determination of the vapour density was made by Meyer's method, upon the portion boiling at from 204° to 206° C., and conduced to the formula $C_{10}H_{18}O$, but the substance decomposed at the temperature at which the vapour density was taken.

The Action of Sodium upon the Elæopten (*Diosmelæopten*) resulted in the formation of a brownish decomposition product. The addition of sodium was continued until decomposition ceased and water was then added. The brown semi-solid decomposition product was separated from the liquid by filtration through wetted paper. The filtrate was agitated with ether, then treated with more sodium, and acidulated with hydrochloric acid, which separated an oil having a thymol-like odour. It was extracted with ether, and the solvent evaporated spontaneously, when it distilled at from 225° to 238° C., and on fractioning the greater part boiled at from 230° to 232° C. This portion constitutes a light yellowish liquid, very dense, of the odour and taste of thymol and whose aqueous solution (it is slightly soluble in water) does not become coloured on the addition of ferric salts. A combustion of this substance gave H 9·62 and C 77·54, which points to the formula $C_8H_{12}O$, having in 100 parts H 9·67 and C 77·42. The determination of the vapour density by Mayer's process, led to the same formula.

The composition of this liquid, which has phenol-like qualities, would seem to indicate that it is a homologue inferior to ordinary camphor and until its true chemical character is better understood, it is proposed to name it dioscamphor.

Examination of Stearopten (Diosphenol of Flückiger).—The crude stearopten, as previously obtained, was depurated from adhering brown oil by compression between dry paper and then crystallized repeatedly by dissolving in the smallest possible quantity of alcohol, then lightly heating, adding water, slowly, until a slight turbidity ensued, and cooling, when long, white, needle-shaped crystals are formed, having a camphoraceous odour. Heated at 82° C. they sublime, partially, and commence to boil at 220° C., when decomposition ensues. The diostearopten is slightly soluble in water, very soluble in alcohol or ether, and *in neutral solution* has a mint-like camphoraceous odour. The alcoholic solution treated with ferric chloride was tinged an apple-green and then, on addition of more of the reagent, deepened into a bottle-green colour. The hydrates of potassium and sodium dissolve it well, and from their solutions hydrochloric acid precipitates it in minute crystals. Carbonate of ammonium does not dissolve it. It acts, then, like a compound of phenol origin.

The analyses made give different results from those obtained by Flückiger, viz.:—

	Obtained.		Theory. (*F.*) $C_{14}H_{22}O_3$	(*S.*) C_5H_8O.
H	9·79	9·85	9·24	9·52
C	71·65	71·44	76·58	71·44

Apparently, then, the buchu camphor is much more simple in its chemical structure than the results of Flückiger would seem to indicate; it appears to be nothing more than an oxycamphor $C_{10}H_{16}O_2$. This product is perfectly identical in all the characteristics published concerning the diosphenol of Flückiger.

The determination of the vapour density does not tend to establish the formula at $C_{10}H_{16}O_2$ as the substance was decomposed during vaporization, but, in the future with more time and material, correct results will be sought for through another method, and the chemical relation will be ascertained between the diostearopten $C_{10}H_{16}O_2$ and the liquid compound $C_8H_{12}O$. The former is probably a phenylic ether containing, also, one phenol hydroxyl.

Certain other compounds isolated, with alcohol, from the leaves after the separation of the volatile oil, will also be investigated. One of these substances, called *diosmin*, differs completely from the diosmin of Brandes, but may, perhaps, be identical with the diosmin of Landerer, although obtained by a new method of extraction.

THE TESTING OF BALSAMS, RESINS AND GUM RESINS.*

Dieterich and, more recently, A. Kremel have attempted to extend the Köttstorfer method of examining fats and oils to the testing of substances included in the groups of balsams, resins and gum resins. The leading idea in Köttstorfer's method, it will be remembered, is that in fats and oils, besides free fat acids, there are present glycerine ethers of fat acids. By titration it is ascertained how much potassium hydrate is required by a unit of the fat or oil to combine with the free acid, and, further, how much is used up in the saponification of the glycerine ether. The former quantity is distinguished as the acid number, the latter as the ether number, and the sum of the two as the saponification number. Quite similar data are yielded by balsams, resins and gum resins, as all these substances contain free acids mixed with varieties of ethers.

The determination of these bodies may, therefore, be carried out in a manner quite analogous to the Köttstorfer method. About one gram of the substance to be examined is dissolved in alcohol free from acid reaction, some drops of phenolphthalein added and then titrated with half-normal potash solution until there is a permanent red coloration. The quantity of caustic potash used for one gram of the substance is taken in millig ams,

* *Pharmaceutische Zeitung*, August 11,

and this is called the acid number. In those substances where ether is present in addition to acid, a definite portion of the liquid is heated with excess of half-normal potash solution, and then titrated back with hydrochloric acid. The quantity of alkali used is calculated to one gram of the substance, and the number of the milligrams similarly taken as the ether number. The sum of the two gives the saponification number.

In the examination of substances not completely soluble in alcohol they are dissolved with the aid of ether-alcohol or ether-chloroform. Gum resins are first exhausted in a Soxhlet apparatus with alcohol, and the alcoholic extract, after drying and weighing, is estimated; the numbers obtained are not calculated in respect to the whole of the substance originally taken, but only for the quantity of resin soluble in alcohol. In the determination of light coloured substances the use of phenolphthalein presents no difficulty; with dark coloured substances, such as peru balsam, guaiacum resin, etc., the difficulty is overcome by adding water to the alcoholic solution up to the point of milky turbidity, and then dropping in alternately potash solution and, after shaking, phenolphthalein, the end reaction being easily recognized by the formation of a red ring upon the surface of the milky liquid. In some cases (copal and sandarac) there is a formation of precipitate after the addition of potash solution, due to the potassium salts of the particular resin acids being difficultly soluble in alcohol; when this occurs the addition of water will redissolve the precipitate.

The following table, giving the results of the examination of different balsams, shows that a conclusion could be very well drawn from numbers obtained as to the nature of a sample. For instance, an addition of gurjun balsam to copaiba balsam would very considerably lower the acid number of the latter.

Balsams.	1 gram substance=mg. KOH.		
	Acid No.	Ether No.	Saponif. No.
Balsamum Canadense	83	—	—
,, ,,	81·3	—	—
,, Copaivæ Maracaibo.	73–75	—	—
,, ,, ,,	76	—	—
,, Cop. Mar. from Capaifera nitida	78·7	—	—
,, Copaivæ Maturin	77·1	—	—
,, Copaivæ Para	29·6	—	—
,, ,, ,, (?)	78·2	—	—
,, Dipterocarpi (Gurjun Bals.)	20·0	—	—
,, Dipterocarpi (Gurjun Bals.)	19·3	—	—
,, Dipterocarpi (Gurjun Bals.)	14·2	—	—
,, Dipterocarpi (Gurjun Bals.)	5·8	—	—
,, Mecca	45·1	—	—
,, ,,	51·8	—	—
,, Peruvianum	40·4	189·8	230·2
,, ,,	40·8	199·2	240·0
,, ,,	49·4	181·1	230·5
,, ,, fr. Myroxylon Peruiferum	36·7	104·9	141·6
,, Tolu	127·2	26·7	153·9
,, ,,	100·6	58·7	159·3
Terebinthin. comm.	128·7	—	—
,, ,,	124·4	—	—
,, Venet.	68·4	—	—
,, ,,	70·3	—	—
,, Chia	47·8	—	—
,, ,,	53·4	—	—
Styrax liquid.	47·6	31·9	79·5
,, Alcohol. depur.	61·0	76·0	137·0

The important kinds of resins are also distinguishable from one another by considerable differences in the figures, as will be seen from the following table :—

Resins.	1 gr. substance=mg. KHO.		
	Acid number.	Ether number.	Saponif. number.
Benzoin, Siam	141·4	55·4	196·5
,, Penang	122·2	57·0	179·2
,, Sumatra	96·0	60·9	156·9
Colophonium, light	163·2	—	—
,, dark	151·1	—	—
,, americ.	173·0	—	—
,, anglic.	169·1	—	—
Copal	132·0	—	—
,, afric.	147·3	—	—
,, indic.	140·2	—	—
,, brasil.	127·4	—	—
,, fr. Guibourtia copalifera	128·9	—	—
,, Zanzibar	85·3	—	—
,, ,,	80·0	—	—
Damar.	31·0	—	—
,,	34·3	—	—
,, from Damara orient	34·2	—	—
,, blanc from Vateria indica	15·4	—	—
Elemi, Manilla.	3·0	24·2	27·2
Elemi	17·6	7·8	25·4
Euphorbium.	13·4	64·6	78·0
Guaiacum	23·28	—	—
,,	44·0	—	—
Jalapin	14·7	172·9	187·6
Jalap resin	12·9	119·8	132·7
,, ,,	12·1	120·7	132·8
Lacca in granis (alc. depur.)	—	—	174·8
Shellac, white	73·7	102·8	176·5
,, yellow	65·5	50·2	115·7
Mastic.	61·8	—	—
,,	90·9	—	—
Pix burgund.	142·2	—	—
Resina Pini	77·8	—	—
,, ,, (alcoh. dep.)	102·6	—	—
Sandarac.	144·2	—	—
Scammonium e radice	14·6	171·0	185·6
,, Aleppo.	8·2	172·0	180·2
Succinum	34·4	74·5	108·9
,,	33·4	91·1	124·5

With gum resins the indications are not so useful :—

Gum resin.	Per cent. of resin.	gr. resin=mg. KHO.		
		Acid No.	Ether No.	Saponif. No.
Ammoniacum, afric.	77·6	59·0	123·0	182·0
,, persic.	67·7	112·0	30·6	142·6
,, ,,	67·1	110·0	50·0	160·0
,, ,,	70·7	100·0	50·6	150·6
Asafœtida	72 1	26·8	145·2	172·0
,,	35·6	54·8	182·1	236·9
Bdellium	48·6	26·0	34·7	60·7
Galbanum	74·3	28·3	119·3	147·6
,,	74·2	28·0	132·2	160·2
Gamboge	79·6	100·0	56·7	156·7
Myrrha, indica	30·7	42·1	130·8	172·9
Myrrha	39·5	64·0	95·0	159·0
,,	—	60·2	116·5	176·7
,,	—	70·3	145·8	216·1
Olibanum	—	59·3	6·6	65·9
,,	72·1	46·8	41·0	87·8
,, indicum	67·0	50·3	60·5	110·8

The titration of a gum resin is best effected by mixing one gram of the substance with some indifferent body (powdered gypsum by preference) and extracting it with 95 per cent. alcohol. The residue from evaporation of the alcoholic extract, which gives the percentage of resin, is then redissolved in 50 c.c. of alcohol; half of the solution is used in the acid determination and the remainder in the ether determination, the quantity of potash used being calculated to the gram of pure resin. The numbers obtained with gum resins were not very concordant, whilst the differences between the different kinds are not so great as with the resins. At present, therefore, it seems that titration will only have a limited application to the determination of gum resins.

PRODUCTION OF PULQUE AND MESCAL IN MEXICO.*

Pulque and mescal, which are fermented and distilled liquors with a great variety of modifications, are made from the sap and root of the maguey plant or aloe, known as the *Agave Americana*. This plant, in some thirty varieties, grows wild throughout Mexico, and in many districts it is carefully cultivated. It enters into the domestic economy and habits of the Mexicans, and forms one of the most useful products of the republic. Its most important production is the fibre yielded by the long narrow serrated leaves when pressed, and this fibre is said to be almost equal in quality to the best Yucatan heniquen, or jute. Ropes of great strength are made from some varieties of the plant growing in special localities, but the pressed leaves are everywhere of importance for the manufacture of paper. For many centuries past, textile fabrics have been made from them by the Indians. It is stated in a report of the United States Agricultural Department, that the Mexican Government is liberally encouraging the paper manufacture, and a large company has been organized to cultivate maguey plants on Government lands. The list of products furnished by the maguey is very large, and besides pulque, or Mexican beer, and mescal, the chief spirit of the country—a distillation resembling a coarse quality of gin, and very intoxicating in its character—there is a fine quality of brandy, known as *tequila*. The daily consumption of pulque, or beer, in the city of Mexico alone appears to be about 150,000 quarts, and it appears to be the universal beverage of the country. Being in strength about equal to common cyder, it is of whitish hue, and has a slightly acid taste, with an odour which makes it very disagreeable to all but the natives. A maguey plant will reach its maturity in from five to ten years, and grows most rapidly in the warm sections, though not so luxuriantly in the hot coast belts. Large quantities of mescal are produced in the State of Oajac, and *tequila*, or maguey brandy, comes chiefly from the district of the same name, in the State of Jalisco. *Tequila* is highly valued on account of its purity and strength. The Mexican Indians are said to be inordinately fond of pulque; it is consumed in large quantities, and forms the basis of a great number of liquors, all of which are intended to make it stronger or more agreeable. Pulque is made a source of large domestic revenue by all the States; the daily tax paid on it at the gates of the city of Mexico is estimated at about £1000. Another liquor produced direct from the maguey is known as hydromel, or honey juice, being the pure and unfermented juice or sap of the agave. *Pulque de chirmoya* is made from the hydromel of the cultivated agave, cut unripe at the age of three or four years. This is put into skins which have contained the "mother," or pulque made at the regular age, five years and upwards. When transported, the shaking gives it flavour and strength. A choicer liquor is made by heating, underground, old heads of agaves, grinding them coarsely on a stone, and then settling them to ferment in a pulque vessel, after which the contents are distilled. The first jar is known as *bingeré*, and the rest as *bingarroté*. *Pulque tlachique*, a favourite beverage, is made from tender agaves; cut when unripe. There are various admixtures made in connection with this. It is quite thick, and *quahchan* is the same, with the fruit of the Peru tree, deprived of its peel, and left in the liquid for three or four days. *Capololte* is made of the same variety of the pulque, with the seed of the red Peru tree infused therein. After fermentation it is hot and noxious. A species of mescal is made by distilling *pulque tlachique* and molasses, after being allowed to ferment in goat-skin vessels. In addition to these, there are about seventeen other compounds made by mixing sugar and sweet almonds ground with the juice of corn-stalks, sugar or honey being added; by mixing white pulque with blackberries, capulins, pepper, and sugar; by mixtures of prickly-pear juice and fermenting or distilling the same; by adding to white pulque, honey, pepper, anise, and capsicum, leaving the same to ferment for twenty-four hours; by mixing pulque with wild plums (*jabos*) and sugar. *Mantequila* is made of pulque, brandy, and sugar. A wine named *rescado* is made of the trunks of agaves deprived of leaves, cooked in an oven for about a fortnight, then mashed and put with pulque into skins, to which is added mountain hysop, and the liquid is left for two days. *Tepemé* is a wine or liquor produced from the pressed leaves of the narrow agave, in which acacia wood is boiled in order to give it strength. *Mescalde guadalajara* is made by first fermenting in skins, water, honey, and agave heads, and then distilling the liquor. The maguey plant from which the pulque is made grows as high as ten or fifteen feet, and the miel or juice is sucked up through a syphon made of a large gourd with a cow's horn in it, which is called *acajete*. Accompanying the men whose business it is to collect this juice, and who are called *thachiqueros*, are donkeys, which have their backs laden with sheep skins, into which the juice is poured after being sucked up by the syphons. The plant is prevented from flowering at the age when it usually yields pulque, and during its growth it throws out shoots or young plants which are removed from the parent plant when about three feet high, that is after two years' growth. These are planted out at a distance of a yard apart. The *thachiqueros* go periodically among the plants, and mark those which are fit for tapping by cutting a cross on the top of the highest stalk of each plant. When the maguey is fit for tapping, the *thachiqueros* thrust aside the spiky stalks, and cut out the meyolote or central spoke, leaving a cavity which they visit after eight days, when it is full of juice. The plants only begin to yield juice when the flower stalk is on the point of its development, and this is generally discovered by the direction of the radical leaves. When the flower stalk is on the point of formation, these leaves rise from the earth to which they are inclined and endeavour to form a junction so as to protect the flower. They become also of a clearer green, and there are other signs which are closely watched by cultivators. The maguey, after the expiration of eight days, is tapped regularly three times a day, and yields over a gallon a day, and bears for three months, each plant producing about one hundred and twenty gallons before it dies. The juice, when extracted, is conveyed to a large building fitted with square wooden frames, on which are stretched cowhides shaped like vats, the hair being upwards. The liquid appears to curdle during fermentation, and has an offensive odour; fresh juice is applied three times a day, and when drawn off the liquor is placed in barrels and and sold to the pulqueries, or drinking places. The city of Apam produces the finest pulque sent to the city of Mexico, and this sells readily at about fourpence a gallon. The maguey will flourish on the most arid and rocky soils, is not affected by drought, hail, or even severe frosts, and the plant is used for almost every domestic purpose, from making intoxicants to the thatching of huts.

* From the *Journal of the Society of Arts*.

COCAINE COTTON.*

BY K. ELLER.

A very easy, neat and successful way whereby to obtain the effect of cocaine is to combine it with absorbent cotton. As thus prepared it can easily be applied in a variety of ways to assuage pain and bring quick relief to those suffering. It requires the suggestion merely in order to insure its ready preparation by any ordinarily skilful pharmacist; for instance, a given weight of absorbent cotton, a certain quantity of solution of cocaine of definite strength, and the requisite skill, and a cocaine cotton of exact cocaine value will be the result. A three per cent. solution of cocaine is a good average strength to work with, and on this basis the following formulæ are suggested, unless an exception be noted:—

Cocaine Cotton.

Solution cocaine, 3 per cent.	1 oz.
Absorbent cotton	1 oz.

Thoroughly saturate the cotton, carefully, dry same in a current of warm air and card the cotton to restore it to its former appearance.

Cocaine Cotton with Morphia.

(For toothache.)

Solution cocaine, 3 per cent.	1 oz.
Sulphate of morphia	12 grs.
Absorbent cotton	1 oz.

Dissolve the morphia in the solution of cocaine, and proceed as above.

To be used by introducing a small piece of the cotton into the cavity of the tooth. It can also be used for ear-ache by moistening a suitable piece, with a few drops of water, laudanum or alcohol, and carefully placing it in the ear passage.

Borated Cocaine Cotton.

(For burns and scalds.)

Cocaine solution, 2 per cent.	1 oz.
Boracic acid	30 grs.
Glycerine.	1 dr.
Carbolic acid	20 grs.
Absorbent cotton	1 oz.

Dissolve the boracic acid in the glycerine and cocaine solution, add the carbolic acid, and proceed as in making plain cocaine cotton.

Very useful in the treatment of burned and scalded surfaces, and also in troublesome chafing, where pain and persistent inflammation are attendants.

This list is capable of very large extension. Only this short suggestion is needed to enable the pharmacist to carry his experiments to the limit of wish or convenience.

JABORINE.†

BY HARDY AND CALMELS.

Pure dry pilocarpine does not yield jaborine when heated at 100° for six hours, neither can this substance be obtained by the action of alcoholic iodides on argentopilocarpidine. If, however, carefully dried pilocarpine is heated rapidly to 175°, kept at this temperature for about half an hour, and the product extracted with water made alkaline with baryta, and shaken with ether, the ether contains jaborine and the aqueous solution contains pilocarpidine and jaboric acid. *Jaborine* separates from alcohol or ether in a brown mass, which changes to a brittle, resinous solid. It is insoluble in water, but dissolves readily in ether, and is also soluble in jaboric acid. From solutions of the hydrochloride it is thrown down by potash as a curdy precipitate, which readily agglomerates under warm water. When boiled with concentrated aqueous potash it is converted into pilocarpidine.

Jaborine hydrochloride is extremely soluble in water and alcohol. When boiled with excess of hydrochloric acid, it is converted into pilocarpidine hydrochloride. Solutions of jaborine are brown with a greenish fluorescence, which is not completely removed by animal charcoal. An alcoholic solution of free jaborine yields with a limited quantity of platinic chloride, a dirty white, gelatinous precipitate of the composition

$$(C_{23}H_{32}N_4O_4)_2,PtCl_4\ ;$$

with platinic chloride in excess, a yellowish-white precipitate of the composition $C_{22}H_{32}N_4O_4,PtCl_4$, and with auric chloride a precipitate of the composition

$$C_{22}H_{32}N_4O_4,2AuCl_3.$$

In presence of a slight excess of hydrochloric acid, platinic chloride, whether in excess or otherwise, precipitates the compound $C_{22}H_{32}N_4O_4,H_2PtCl_6$.

Jaboric acid is separated from pilocarpidine by precipitating with excess of silver nitrate, which forms a curdy precipitate of the composition $C_{19}H_{24}N_3O_5Ag,AgNO_3$. Jaboric acid resembles jaborine in appearance, but is very soluble in water, and is not removed from its aqueous solution by ether. With alkalies it forms gummy salts, which dissolve in water and alcohol, and are not decomposed by carbonic anhydride. With silver nitrate in limited quantity it forms the compound $C_{19}H_{24}N_3O_5Ag$, which is precipitated by alcohol in the form of a brown powder. Hot concentrated potash or boiling hydrochloric acid converts jaboric acid into pilocarpidine and β-pyridine-α-lactic acid. Alcoholic solutions of jaboric acid give with platinic chloride in limited quantity a viscous precipitate of the compound $(C_{19}H_{25}N_3O_5)_2,PtCl_4$; with platinic chloride in excess, a yellow precipitate of a hemiplatinochloride

$$(C_{19}H_{25}N_3O_5)_2,PtCl_4 + 2\,C_{19}H_{25}N_3O_5,PtCl_4.$$

With auric chloride a diaurochloride, $C_{19}H_{25}N_3O_5,2\,AuCl_3$, is formed. The hydrochloride and nitrate of jaboric acid are viscous substances; an aqueous solution of the former gives a viscous precipitate of the composition

$$(C_{19}H_{25}N_3O_5)_2,H_2PtCl_6,$$

with a limited quantity of platinic chloride.

Jaborine and jaboric acid are products of the condensation of pilocarpine, this condensation taking place on the betain nucleus, and may be thus represented (Py = pyridyl):—

$$NMe_3\begin{matrix}<\text{CMePy}\beta\cdot\text{CO}\cdot\text{O}\\ \text{O}\cdot\text{CO}\cdot\text{CMePy}\beta\end{matrix}>NMe_3.$$

Jaborine.

$$\text{OH}\cdot\text{CMePy}\beta\cdot\text{CO}\cdot\text{O}\cdot NMe_3\cdot\text{CMePy}\beta\cdot\text{COOH}.$$

Jaboric acid.

THE BEVERAGES IN COMMON USE.*

BY PROFESSOR DUJARDIN-BEAUMETZ.

For convenience I shall treat of beverages under three heads,—water, aromatic beverages, and alcoholic beverages.

Water plays an indispensable part in the alimentation of man, constituting more than two-thirds (70 per cent.) of the bulk of the organism. It cannot, then, be omitted from the daily rations of man, and if we include in our estimate the aqueous principles contained in foods, a man ought to consume 3000 grams (or somewhat more than three quarts) of water a day.

I cannot here do more than touch upon this question, which is so important from a hygienic point of view, and if I were to attempt to treat the subject of drinking-waters with any proper degree of fulness I should require several lectures. Therefore I can only call your attention to a few points of interest which have especial reference to hygienic therapeutics, then I shall briefly consider water in reference to certain general properties, and I shall lastly allude to the mineral waters (called table-waters), natural and artificial.

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* From the *Druggists' Circular*, December.

† From *Compt. Rend.*, cii., 1251–1254. Reprinted from the *Journal of the Chemical Society*.

* A lecture on Hygienic Therapeutics, delivered in Cochin Hospital. From a translation in the *Therapeutic Gazette*.

Water contains air and salts. The presence of air is absolutely necessary to render water potable. Boussingault insists that such water should contain at least from 25 to 50 cubic centimetres of gases per litre. These gases should consist of from 8 to 10 per cent. of carbonic acid, and of a mixture of oxygen and nitrogen containing from 30 to 37 per cent. of oxygen and 63 to 70 per cent. of nitrogen.

When water is deprived of these gases it becomes "flat" and indigestible, as is the case with boiled water and the water that melts from the glaciers. Boiled water must first be aerated by churning before it is fit to drink, and glacier water becomes aerated naturally as it forms cascades in its course.

Are the salts also as useful as air in rendering water potable, and is drinkable water fairly represented by water which is chemically pure, corresponding exactly to the formula H_2O?

In France, since the experiments of Dupasquier, and those especially of Boussingault, the opinion prevails that the mineral ingredients, carbonates, sulphates, etc., must attain at least the figure of 50 centigrams per litre in order that water may be fit for drinking purposes. These salts are absolutely necessary for the constitution of the skeleton, especially in the early life of man and animals. In England this view is not entertained, and Frankland has given expression to the opinion that as man finds in his food the quantity of lime necessary for his nutrition, the water which he drinks is the purer and better the more it resembles distilled and thoroughly aerated water. However this may be, when the proportion of calcareous salt is too high, the water becomes hard, and is liable to cause constipation.

Therapeutics has utilized the properties of these limy waters in the treatment of diarrhœa, persons suffering from this affection being often benefited by drinking the hard water of certain wells; and lime-water, which is the familiar combination of water and slaked lime, renders us great services in diarrhœas (especially in infantile therapeutics); the constipating properties of milk are augmented by the addition of lime-water.

Water contains a great number of micro organisms, the study of which has so recently been made, and the schizomycetes of various waters have been investigated. In this interesting line of study Marie Davy and Miquel, at the Observatory of Montsouris, have made valuable contributions. Taken in their aggregate, these micro-organisms may be divided into three groups. Those of the first are favourable to the health of those using the waters, those of the second are indifferent, those of the third injurious.

The first assimilate the carbon and eliminate the oxygen of carbon-dioxide; they aerate the water. This is the office of certain algæ containing chlorophyll, and especially the *rôle* of diatoms. The baneful micro-organisms consist of the microphytes of putrefaction. They set free nitrogen under the form of ammonia, and render the water putrid and injurious.

The waters of drinking sources may also contain the micro-organisms of infectious diseases, among which the bacteria of cholera and typhoid fever claim especial mention. Lastly, the ova of various entozoa may also infect sources of water-supply, and it is, as you know, through the contamination of water with the dejections of dogs infested with the Tænia echinococcus that man, drinking this water, becomes the victim of hydrated cysts.

Leaving on one side the "infinitely little," one may, as Gérardin has shown, judge of the quality of any kind of water by its flora and fauna. As for the flora, if the water-cress (*Nasturtium officinale*) is not, as it is held to be in popular estimation, the health of the body it is the health of the streams. Wherever it grows the water is wholesome, while on the contrary, the duck-weed or water lentil (*Lemna minor*) always indicates a water of bad quality. As for the fauna, it is everywhere known that the water of streams which are deprived of fishes and molluscs is unfit for drinking purposes.

The temperature of water destined to be drunk is a matter of some importance. Water when iced stimulates the digestive functions when taken in small quantity, and lowers the temperature. Liebermeister estimates this depression of temperature at 0·45° C., and Winternitz at 0·22° C. for the axilla. The usage of ice-water, however, when prolonged, leads to diarrhœa and intestinal irritation, and doubtless much of the gastro-intestinal disorder of countries where free use is made of ice-water is due to this cause.

As for the refrigerant action in general of cold water, if it may be the determining cause of pulmonary and other congestions, as has been observed as a sequel to lavage of the stomach with too cold water, it may, nevertheless, be utilized as a powerful antithermic means in the febrile process: in fact, in pneumonia and typhoid fever we derive a real advantage from the use of cold drinks.

Warm water, on the other hand, determines a rise in the temperature of the body, and it may be affirmed that all our sudorific herb teas, with the exception of such as may contain jaborandi and its alkaloid pilocarpine, which act directly on the sweat-glands, owe their property not to the medicinal principles which they contain, but to their temperature. These hot draughts render us great service, as is known, in the initial periods of eruptive fevers, but they are likely to disturb digestion and provoke vomiting, and they do not quench thirst.

All parts of the digestive tube may absorb water. This is so true of the buccal mucous membrane, that liquor-tasters—a class of professionals whose business it is to test the quality of liquors by holding a mouthful, mingled with air, in their mouth, and then spitting it out—have been known to experience more or less intoxication from the simple testing of liquor in this way, and many a liquor-taster has become a drunkard. It is, however, in the intestine that the absorption of liquids principally takes place. Béclard has shown that water passes very rapidly into the intestinal canal. He has found it two minutes after being swallowed in the duodenum of a man the subject of a duodenal fistula, and, six minutes after being swallowed, in the cæcum of a horse.

I have in my hospital service instituted another series of experiments, showing with what rapidity water disappears from the stomach. In a patient affected with a slight degree of dilatation of the stomach, after having well emptied the gastric cavity by means of a stomach-pump, I introduced a quart of water. At the end of an hour there remained but a half-pint in the stomach. On frequently repeating this experiment, I have found that, on an average, a quart of water per hour will pass from the stomach into the intestine.

The water after being absorbed is rapidly eliminated by the kidneys; it never accumulates in the blood, and determines no alteration of the hæmoglobin. Leichtenstern, in an individual who had drunk seven quarts of water, found no modification in the composition of the blood. This rapid absorption, and no less rapid elimination of water by the urine, sufficiently explain the diuretic effects of water, and my regretted master, Bouchardat, was right in saying that water is the best and most powerful diuretic.

The greater part of our mineral waters, called diuretic waters, such as Contrexville, Evian, Vittel, etc., are only such by virtue of being well tolerated by the stomach, and their ready absorption and elimination. This diuretic action of water is of exceeding importance, and the numerous applications thereof will be apparent in the course of these lectures. As for the action of water on nutrition, I shall not refer to this again. Already, in a previous lecture on the primordial alimentary principles, I showed you that experimenters have arrived at different conclusions, one party maintaining with Genth, Bischoff, Forster, Henneberg, Stohmann, Schmiedeberg, Germain-

Sée, Albert Robin, that water augments the excretion of urea, and may be considered as an agent of disassimilation; the other party, basing itself on the very accurate experiments of Débove and Flamant, claiming that water has no influence on the excretion of urea; nor can it be said that the question is yet definitely settled.

I come now to the subject of the table mineral waters.

In the volcanic region of Central France (Auvergne) we find a great number of springs charged with carbonic acid. These waters, which do not differ in their composition save in the quantity of carbonic acid which they contain, constitute in France our principal table mineral waters; chief among them are St. Galmier, Condillac, Chabetout, Morny-Châteauneuf and De l'Ours. These table-waters are pleasant to take and of great purity. By the carbonic acid which they contain they quiet the stomach and regulate digestion. Their purity makes them especially sought after in times of epidemic. At the same time it will not do to use them exclusively, for they get the stomach accustomed to their stimulation so that it will not digest food without the help of its gaseous draught, and they eventually exhaust the stomach. Lastly, do not forget that certain patients are absolutely rebellious to the administration of these effervescent waters, which may provoke in such persons irritations of the digestive tube.

In connection with these natural mineral waters, I shall say something about the artificial seltzer waters, manufactured now on so large a scale. They are in reality not nearly so good as the natural, and by reason of the low price of the latter, there is but little justification for the substitution.

Moreover, the closeness of union between the carbonic acid and the water which exists in the water as it flows from the springs cannot be imitated in any artifical combination. When the manufactured seltzer water is drunk the gas escapes with too much force and volume, and may oppress the stomach; besides, the gas with which the water is charged may contain impurities from faults in its fabrication. Moreover, the presence of the carbonic acid in the water is no guarantee of the purity of the latter, whose source may not have been free from pollution. Lastly, according to Armaud Gautier, the metallic armatures of the siphons contain lead, and this metal is almost always found in the artificial seltzer waters.

I have finished what I had to say regarding water, and I come now to our second division, which comprises the aromatic beverages.

Under the head of aromatic beverages I propose to speak exclusively of such as contain a certain alkaloid, with the formula $C_8H_{10}N_4O_2$, which Runge, in 1820, found in coffee, and to which he gave the name *caffeine*, which Oudry, in 1827, found in tea, and which he called *theine*, which Martins discovered in the *Paullinia sorbilis*, and which finally Hæckel and Schlagdenhauffen have isolated, along with theobromine, from kola nuts.

In order to simplify the exposition into which I am about to enter, I will admit that all these alkaloids are identical, although I know very well that it is by no means demonstrable that isomeric bodies have absolutely the same physiological action. I shall not touch upon the different hypotheses which have been put forth relative to the atomic composition of this body. I have already called attention to this point in a recent study on the derivatives of caffeine.* I have shown that if, according to Strecker, caffeine is only the methyltheobromine, according to Fischer, on the other hand, caffeine and theobromine are derivatives of xanthine; theobromine is the bimethylxanthine, while caffeine is the trimethylxanthine. But I cannot now take up your time with these chemical researches.

All the aromatic beverages containing caffeine (or the isomeric alkaloids above mentioned) for their bases are used in immense quantities all over our globe, and their employment is much more extensive than that of alcoholic beverages.

Many opinions have been put forth as to the physiological and hygienic action of coffee. These may be reduced to three hypotheses. Coffee diminishes the excretion of urea and is a waste-restrainer; it does not modify the urea excretion, and is a force-producer; or lastly, it acts as a food, supplying elements of nutrition.

The first view is supported by Schultz, Gasparin, Boker, Lehman, Frölich, Trousseau and Pidoux, Rabuteau, Marvaux, etc., who claim that coffee diminishes the quantity of urea excreted; that it does not nourish, but that it prevents denutrition. This is the waste-restraining-aliment theory.

But to facts advanced by these physiologists other facts are opposed, and we see Roux and Giraud in France, Binz in Germany, Brackenridge in England, maintain that coffee, as well as caffeine, in no respects modifies the figure of urea. Hence Gubler, basing himself on the researches of these authorities, affirms that coffee has no action on nutrition, but that it is a tonic, or, rather, a force-producer.

Lastly, Payen has shown that coffee contains nitrogen, and this in quite notable proportion, since in green coffee this essential element exists in the proportion of 4·48 per cent., and in roasted coffee in the proportion of 1·75 per cent. He shows, moreover, that the admixture of coffee with milk, in ordinary usage in many parts of the world as a breakfast beverage, is one of the most nutritious of all drinks, a mixture of 500 grams of infusion of coffee, 500 grams of milk, and 75 grams of sugar containing, according to his estimate, 49 grams of nitrogenous substance and 100 grams of hydrocarbon and salts.

This view has been adopted by Fleury, Bouchardat and Jomand, and is supported by facts, being in accordance with the experience of entire populations (in England, Germany, Switzerland and the United States), who find sustenance in their breakfast dish of coffee.

Coffee is, then, by virtue of the nitrogen which it contains, a food, and you remember that in the primordial alimentary principles I included caffeine among the azotized substances. Moreover, recent experiments of Guimaraës show positively that augmentation of urea follows the administration of coffee.*

But is coffee anything but an aliment? It possesses special tonic properties on the circulation and nervous system. All experimenters are agreed in the fact that under the influence of coffee the beatings of the heart become more rapid and more energetic, the circulation more active, and the urine more abundant. Leblond's study has given us in this regard tracings of high importance. Moreover, whether by the activity which it impresses on the circulation, or by a direct action on the nervous elements, coffee directly affects the brain, and may be called "a cheering and thought-inspiring beverage."

This threefold action, on nutrition, on the circulation, and on the nervous system, makes coffee an admirable tonic, and we are justified in saying that it is largely by reason of the strong coffee, which habitually forms a part of their diet, that our troops have been enabled in the in the burning climate of Algiers to endure the most exhausting campaigns.

It is also owing largely to the coffee, which is becoming more and more an article of daily consumption among the farmers in the country, that we see this class of people able to endure the great increase of toil to which they are subjected in haying and harvesting seasons.

Coffee, in order to be fit for nutrition, must first be torrefied. Payen has made a special study on the modifications which coffee undergoes by roasting, and has shown that during the process there is a breaking up of the chlorogenate of potassium and caffeine, and a setting free of a part of the caffeine held in combination.

* Dujardin-Beaumetz, "On the Physiological and Therapeutic Properties of the Derivatives of Caffeine." (*Bull. de Ther.*, 1886, t. cx., p. 241).

* Guimaraës, "On the Physiological and Hygienic Action of Coffee" (*Arch. de Phys.*, 1884, t. iv., p. 253).

I cannot here touch upon the different modes of preparing coffee, modes by which the properties of roasted coffee are doubtless more or less modified. While in Europe it is the infusion which is drunk almost exclusively, the inhabitants of the East prefer the decoction, and, if we may believe their statement, the decoction, while preserving the tonic and alimentary properties of the coffee, is quite devoid of the exciting properties which characterize the infusion.

The different physiological properties of coffee have caused this food medicine, and its congeners, tea, Paraguayan maté, guarana and kola, to be applied to the treatment of a great number of affections. Its tonic action on the circulation has led to its use in the treatment of diseases of the heart, and Gubler, Lépine and Huchard have shown us all the advantages derivable therefrom. Its diuretic properties have led to its being recommended in dropsies, urinary gravel, and gout. Its cerebral tonic action has rendered it useful in the treatment of migraine and cephalalgia. Lastly, we see its utility recognized in intestinal strangulations and opium poisoning.

I have finished what I wished to say concerning coffee, leaving aside what appertains to infusions made from roasted acorns and chicory, which contain nitrogen, and probably have some food value, but are devoid of caffeine, and therefore of the tonic and excitant properties of coffee.

It remains for me to speak of alcoholic beverages. This is a topic of special interest and importance, and you will permit me to dwell on it at some length. We will study successively alcoholic beverages in general, then the physiological action and digestibility of these beverages. As for alcoholic beverages in general, I shall divide them into three classes: the first includes wine; the second cider, perry and beer; the third distilled spirits and aromatized liquors.

Wine.—It is a profound mistake to suppose that wine is only a mixture of water and alcohol. It is a complete *living whole*, if I may so express myself, all the elements of which constitute so complex and homogeneous an aggregate that we cannot alter any one of them without introducing profound modifications into the composition of the wine. Apart from the water and the alcohol, wines contain glycerin, tannin, essential oils, ethers, salts, and, in particular, tartrates; and according to the period when you examine the wine the quantity of these different elements varies.

Wine, is in fact, as I just told you, a living thing, by the fermentations which it undergoes. It has its youth, its maturity, and its old age. Such crude wines as those of Burgundy are short lived, and their old age is early. Other crude wines, like those of Bordeaux, have a much longer life, and to hasten their maturity are even sent to distant places. Lastly, wines have their diseases, which generally result from want of skill in their fabrication, and from a vicious fermentation determined by the presence of impure products.

The following table from Chevalier and Baudrimont gives the percentage of alcohol in different wines:—

Wine of Marsala	23 83
„ Red Madeira	20·52
„ White Madeira	20·00
„ Port	20 00
„ Bagnols	17·00
„ Malaga	17 42
„ Roussillon	16·88
„ Malaga	15·00
„ Chypre	15·00
„ Red Jurançon	13·70
„ Lunel	13·70
„ d'Angers	12·90
„ Champagne	12·77
„ Grave	12·30
„ White Beaune	12·80
„ Frontignan	11 80
Effervescent Wine of Champagne	11·77
Wine of Cahors	11·36
„ White Mâcon	11·00
„ Volnay	11·00
„ Orléans	10·66
„ Red Bordeaux	10·10
„ Larose	9·85
„ Pouillac	9·70
„ White Vouvray	9·66
„ Château-Latour	9·33
„ Léoville	9·10
„ White Pouilly	9·10
Wine on retail in Paris	8·80
Wine of Château-Margaux	8·75
„ Château-Lafitte	8·73
„ White Chablis	7·88

By glancing over this table you can judge how variable are wines in respect to their richness in alcohol. From a fiscal point of view all wines having more than twenty-five per cent. of alcohol are in France considered as liquors, and all that are above 15·90 per cent. pay double duties. This limit ought to be made even lower, and no wines that contain more than 10 or 12 per cent. of alcohol should be allowed to pass for wines of ordinary consumption. Bear in mind, in fact, that our table wines, and our most celebrated raw wines,—the Château-Lafitte, the Château-Margaux,—do not contain more than 8·75 to 8·88 per cent. of alcohol, and that our wines of Central France scarcely have 7 per cent.

If I insist so much on this point it is because vehement debates have been aroused in our legislative assemblies and in the Academy of Medicine concerning vinage, or the alcoholic adulteration of wines. I am a thorough opponent of the practice of vinage, which, by introducing into wines foreign spirits, modifies and profoundly changes the wine; in fact, in my estimation, spoils it. By the commercial treaties which bind us to Spain, and which allow the introduction of wines with 16 per cent. of alcohol, we see all the spirits of bad quality fabricated in Germany enter our country under the cover of wine.

These wines thus alcoholized entail deplorable consequences on public hygiene, and they have substituted for the drunkenness resulting from the abuse of wine all the worst evils of intemperance seen in other countries where alcoholic stimulants of bad quality are in common use, and we see the fruit of this abundant consumption of strong wines in the grave disorders of the nervous system and the other tissue-degenerating diseases now so prevalent.

But the limits of this lecture will not allow me to dwell further on the alcoholization of wines, which is a subject of the greatest importance.

From a medical point of view wines may be considered under four heads,—the strong wines, the red wines, the white wines, and the sparkling wines.

The strong wines are those which contain 15 per cent. or more of alcohol. These are generally dry wines, which, by their great richness in alcohol, are indicated in febrile maladies and states of prostration where stimulants are required. Unquestionably the wines of Marseilles, of Madeira, of Malaga, also sherry and port, are superior to Todd's potion, which is ordinarily prescribed in our hospitals.

The red wines, by the tannin which they contain, are the tonic wines *par excellence*. Their intoxicating power is not necessarily in relation with the alcohol which they contain, but rather with the ethereal principles which enter into their composition; and I need only remind you here of the distinction so well recognized between the Burgundy and the Bordeaux. The first, by the heady "bouquets" which distinguish them, excite the brain much more than the Bordeaux wines; hence it is that the latter are the most often prescribed in sickness.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, JANUARY 8, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE TESTING OF QUININE SULPHATE.

A SOMEWHAT tedious controversy has been raised within the last eighteen months concerning the amount of cinchonidine sulphate in the quinine sulphate of commerce, and a number of papers have been published on this subject in various pharmaceutical journals, but without such a settlement being arrived at as is desirable from a practical point of view. Unquestionably it is a point of primary importance that a medicinal preparation such as quinine sulphate should be pure, and accordingly we find in all pharmacopœias directions for applying tests by which the purity of this salt is to be ascertained. Thus, for instance, the British Pharmacopœia, 1867, directed that the presence of salts of other alkaloids besides quinine should be tested for by treating a portion of the salt with solution of ammonia and ether; the German Pharmacopœia, 1872, directed that this point should be ascertained by shaking the salt with cold water and adding to the clear filtered solution a certain proportion of solution of ammonia. If these tests gave negative indications, it was to be inferred that the quinine sulphate to which they were applied was, from a practical point of view, pure. Such, at least, was the general opinion at the period referred to, and although neither of the tests prescribed in these pharmacopœias were supposed to be conclusive means of proving the absolute chemical purity of quinine sulphate, they were respectively founded upon the knowledge of the relative solubility of quinine and cinchonidine in ether, and upon the knowledge of the relative solubility of quinine and cinchonidine in ammonia, so as to give indications of the presence of anything more than small quantities of the alkaloid that was then commonly known as quinidine, but is now termed cinchonidine. It is not to be supposed that the application of either of these tests was anything more than a means of ascertaining that quinine sulphate came up to a certain standard in regard to purity, which was regarded as practically sufficient to meet the requirements of the case. It is now nearly ten years ago that a paper was read at an evening meeting of the Pharmaceutical Society, in which it was shown that the conditions under which both of these tests were directed to be applied were not such as would furnish evidence that the amount of cinchonidine present in quinine sulphate was really only a comparatively small quantity. As regards the test of the British Pharmacopœia, it was shown that in the presence of quinine there was always a certain proportion of cinchonidine that did not separate in crystals from an ether solution of the two alkaloids, and that consequently this portion escaped recognition. It was then shown that when the test was applied as the Pharmacopœia directed at least ten per cent. of cinchonidine would be overlooked in this way, and that if the full proportion of ether mentioned in the Pharmacopœia were used an admixture of as much as thirty per cent. of cinchonidine sulphate might escape detection. As regards the test of the German Pharmacopœia, it was shown at the same time that although the data upon which it was based were correct there was a defect in the mode of applying the test. Notwithstanding the great difference in the solubility of quinine sulphate and cinchonidine sulphate the mere treatment of the quinine sulphate to be tested with cold water is insufficient to separate the more soluble salt from the less soluble salt, and hence it was shown that the cinchonidine salt would not be taken up into the liquid where it was to be tested for by the addition of ammonia. The remedy for this defect was at the same time pointed out as consisting simply in heating the quinine sulphate in question with water to the boiling point, and then testing the solution after it had become cold and the greater part of the quinine sulphate had crystallized out. By operating in this way a much more complete separation of the more soluble cinchonidine sulphate could be effected, and it was found that a salt giving no indications of the presence of cinchonidine when treated with cold water would give distinct indications of it when treated with boiling water. The main object of the paper just referred to was to point out the defective character of the tests generally relied upon at that time for ascertaining the purity of the quinine sulphate of commerce, and to show the necessity for a more precise method of testing this article.

As an incidental illustration of the subject the results obtained in the examination of nine samples of commercial quinine sulphate were stated as showing that while the actual amount of cinchonidine salt present in them varied from one to ten per cent. all of these samples, when tested by the Pharmacopœia method, gave results which seemed to indicate that they were of equal purity. The details of the method of testing by which these results were obtained were published very shortly after the paper was read before the Pharmaceutical Society,* and it was shown that by applying in this way the test with ether and ammonia the

* *Pharm. Journ.*, [3], vii., 672.

presence of one per cent. of cinchonidine sulphate could be detected with ease and certainty. Shortly after the publication of this paper, Dr. O. HESSE, of Stuttgart, formulated a mode of applying this test with the use of a graduated tube, which he termed a quinometer, and except in so far as the quantity of material operated upon by him is rather too small, it may safely be said that there is no more convenient, speedy and trustworthy method of testing the degree of purity of commercial quinine sulphate. This method of testing has also been adopted in the present British Pharmacopœia, but with an unfortunate addition, to which reference will be made subsequently. In the *interim*, however, Dr. DE VRIJ had been occupied with the examination of quinine sulphate by the optical method, and, although the presence of traces of cinchonidine salt in the commercial article had long been known, he arrived at the somewhat remarkable conclusion that he had discovered the presence of a very much larger quantity than had been previously suspected, amounting, in some instances, to as much as 18 per cent. There is much reason for believing that this was a very exaggerated view of the matter, and that a considerable portion of the cinchonidine assumed to have been detected in commercial quinine sulphate by the optical method of testing was referrible to inaccuracies in the results furnished by that method, much in the same way that Dr. DE VRIJ has been led to assume the presence of cinchonidine in cuprea bark, though no chemist has yet been able to detect the smallest trace of it. But for the present purpose it is unnecessary to say more on this point, since the whole question as to the validity of the optical method of determining cinchona alkaloids has been but recently discussed in this Journal. The practical result of Dr. DE VRIJ's conclusion as to the large amount of cinchonidine in the quinine sulphate of commerce was the suggestion of a new method of separating the two alkaloids in manufacturing operations by first crystallizing the acid quinine sulphate, and by that means he considered that a pure quinine salt could be obtained which was afterwards to be converted into the ordinary neutral sulphate. The same method of treatment was also applied to the analysis of quinine sulphate, and it was maintained by Dr. DE VRIJ that in this way a perfect separation of cinchonidine from quinine could be effected, that the whole of the cinchonidine would remain in the mother liquor from which the acid quinine sulphate had crystallized, and that the amount of cinchonidine could be ascertained by treatment of the mother liquor with ether and ammonia.

This bisulphate test is, however, to be regarded more correctly as a chemical pitfall, and very little consideration will suffice to shew that none but those who are very blind would be likely to follow Dr. DE VRIJ in its adoption. In the first place the bisulphate method involves a violation of the most essential principle to be observed in the determination of cinchonidine when associated with quinine. For the purpose of ensuring accuracy it is above all things necessary in the first place to make such a separation of the two alkaloids that the quinine may be reduced to a minimum. When that is done the cinchonidine associated with it will always crystallize out from an ether solution pure, and if proper precautions are taken to avoid the formation of gelatinous quinine the quantity may be ascertained by collecting and weighing the crystals. There is no way in which this preliminary separation of cinchonidine from quinine can be better effected than by dissolving the perfectly neutral sulphates in boiling water, and allowing the quinine salt to crystallize out by cooling the solution. Almost the whole of the quinine salt will separate as crystals, and by far the greater part of the cinchonidine salt will remain in solution together with a very minute quantity of the quinine salt, amounting to only $\frac{1}{700}$th part of the weight of the solution. Under these conditions it is possible to apply the ether and ammonia method, and to obtain the cinchonidine in a crystalline form for weighing. But by the conversion of the quinine salt into acid sulphate the mother liquor will retain $\frac{1}{10}$th its weight of quinine salt, and consequently the quantity of quinine associated with the cinchonidine will be relatively so very much larger than when the neutral sulphate is operated upon that all possibility of an accurate determination of the cinchonidine by treatment with ether and ammonia will be done away with. This is done to some extent in the British Pharmacopœia test by the addition of sulphuric acid, and the delicacy of the test is proportionately destroyed. But the defects of the bisulphate method are not merely those already indicated; it cannot be relied upon as a means of separating cinchonidine completely from the acid sulphate, and a number of experiments made in regard to this point have shown that when the bisulphate crystals are converted into neutral sulphate and tested, in the manner above described, by boiling with water, and shaking the clear cold mother liquor with ether and ammonia, the presence of a residuum of cinchonidine is always recognizable. It appears therefore to be an altogether superfluous and roundabout way of dealing with quinine sulphate to convert it into acid sulphate for the purpose of ascertaining the presence of cinchonidine and determining its amount, since the characters of the neutral sulphate as it comes to hand are incomparably more suitable for obtaining the desired result than the acid sulphate, the formation of which appears to be little else than a perverse obliteration of all the conditions essential for obtaining accurate results.

During the official year 1885-86, the Royal Prussian Medical and Pharmaceutical Commission examined 220 pharmaceutical candidates. Of these 192 passed, the knowledge displayed by 40 candidates being as "sufficient," 125 as "good," and 25 "very good." From several of the universities all the men who went up were successful. The number of successful candidates during the same period in the whole of the German Empire was 442, being an increase of 22 as compared with the passes in the previous year.

* * *

A project for the formation of an official Pharmacopœia Commission in Germany is now under consideration, and it is proposed that it shall consist of two sections, each having six members. One section is to represent applied chemistry, pharmacy and pharmacognosy, the other is to represent clinical medicine, physicians and pharmacology. The head of the Government Health Department is to be Chairman of the Committee.

* * *

Scientific pharmacy appears to be in a very unsatisfactory condition at present in Peru, so much so that the question of pharmaceutical instruction is being examined and reported on, by a committee of the Faculty of Medicine of Lima, in the hope of some reform being insisted on which may lead to the establishment of professional education on a really scientific basis. It seems that prior to 1856 no public scientific training was required of pharmacists, a mere system of apprenticeship, with a certificate of competence from a pharmaceutical board, which was granted after a very simple theoretical examination, being needful as a qualification to practise. In 1856, the supervision of pharmaceutical professional instruction was entrusted to the faculty of medicine, to which body were added two pharmacists, who were doctors of science, as professors. The students of pharmacy too were obliged to take the degree of Bachelor of Science. This, however, has of late years been dispensed with by the faculty, and it seems that, in consequence of the lack of scientific training experienced by the later generations of students, since the death of the two professors, no candidates have appeared to fill their posts. It is agreed on all hands that the first step towards pharmaceutical reform is to provide and insist upon a satisfactory scientific training. Another matter too requires regulation. *La Farmacia Española* complains bitterly of the depressed state of the profession, saying that within the last few months eight or ten pharmacies have been closed, and that it is pretty certain that several more will soon have to follow their example.

* * *

In Russia it appears that the proprietors of secret remedies require to have official permission to sell their preparations, for which purpose these are first submitted to chemical examination by a medical committee, and in pursuance of this regulation a medicinal water that has been described as effecting marvellous cures has recently been found to be absolutely identical with the water of the Neva. It is probable that in this country the exercise of some analogous control over the sale and puffing of quack medicines would have a wholesome influence in restraining the barefaced exploitation of popular credulity, of which evidence is now so abundantly furnished. In Austria it is customary to deal with such preparations in a very decisive way by means of a Government edict prohibiting their sale. In the current number of the *Pharmaceutische Post* a recent edict of this description is published in reference to certain secret medicinal preparations that have been much advertised, and the local authorities of the provinces are reminded that while it is unlawful for pharmacists to keep or sell these preparations unless they are furnished by the proprietor with a statement of their composition and mode of preparation it is not lawful for traders of any other class than pharmacists to sell them under any condition. The local authorities are therefore called upon to take proceedings through the police in cases where the law is infringed.

* * *

Arnica is regarded by many as a sovereign remedy for contusions, and in such cases it is often applied copiously in the form of a tincture of the flowers for bathing the part affected. But in some instances the use of the remedy appears to be attended with unpleasant results. A case of this kind is reported by a correspondent, which shows that the use of tincture of arnica requires caution. While returning from America, our correspondent was suffering from a heat bump on his hand, for which the doctor gave him a lotion containing arnica. Next day his hand was much swollen, as well as his head, and erysipelas set in so severely that his friends could not recognize him, the eruption eventually spreading over the whole body. For some time he was seriously ill. This was probably an exceptional case, but Brunton states that in applying tincture of arnica flowers to the skin, if evaporation he prevented its stimulant effect may extend to producing redness, and sometimes an erysipelatous inflammation extending for some distance. In the case above referred to the tincture was mixed with glycerine, and this may have had the effect of preventing evaporation sufficiently to cause the inflammation experienced.

* * *

In a series of experiments as to the effect of different essential oils in masking the odour of iodoform, Mr. Dreier, of Chicago, reports that he obtained the best results with the oils of wintergreen, sassafras and melissa. He found that when either of these had been added in the proportion of one drop to one gram of iodoform the odour of the iodoform remained imperceptible at the end of a week.

* * *

The name of Mr. William Bastick, Pharmaceutical Chemist, formerly of Brook Street, London, has been added to the list of gentlemen entitled to serve as Justices of the Peace for the county of Buckingham.

* * *

We regret to report that information has been received as to the death on the 2nd inst., at the age of eighty-nine years, of Mrs. Hester Snowdon, who was elected an annuitant on the Benevolent Fund in 1881.

* * *

On Wednesday evening next the Chemists' Assistants' Association will hold a "Musical and Social Evening" at the Rooms, 103, Great Russell Street.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, January 5, 1887.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT

MR. THOMAS PRESTON GOSTLING, VICE-PRESIDENT.

Messrs. Allen, Baildon, Bottle, Butt, Cross, Greenish, Hampson, Hills, Hadley, Richardson, Robbins, Savage, Schacht, Southall, Symes and Woolley.

The minutes of the previous meeting were read and confirmed.

The PRESIDENT said he had received a note from Mr. Atkins, saying he was unable to be present on that day, on account of a domestic affliction, of which most members were probably aware, the sudden death of his son's wife. Mr. Atkins had always been remarkably regular in his attendance, and he was sure that all his colleagues would sympathize with him in the painful circumstances which kept him at home on this occasion.

ELECTION OF ANNUITANTS.

The PRESIDENT formally reported the result of the election of annuitants, which has already been published.

THE LATE DANIEL HANBURY.

Mr. HILLS said he had been asked by Mr. Thomas Hanbury to present to the Council a plaster cast of a medallion, executed by Mr. Woolner, of Mr. Daniel Hanbury. In this medallion were represented not only an excellent likeness of the great pharmacographist, whose work and name they all so highly esteemed, but also a faithful and artistic representation of two of the plants which had been very closely associated with his name. On the one side *Ipomœa simulans*, which Mr. Hanbury described and named, and showed to be the source of the Tampico jalap; on the other side the *Liquidambar orientale*, which, after a long investigation, he showed to be the plant yielding the liquid storax of commerce. He had only to ask the acceptance of this cast by the Council, and add that he was very much gratified at being the medium of communication between Mr. Hanbury and the Council.

The PRESIDENT said he was very pleased on behalf of the Council to accept this medallion, and to say how much they all felt indebted to Mr. Thomas Hanbury for this thoughtful gift, one of a series of good deeds which he had done for the Society; and he was sure they would all appreciate this last as much as any of the former. The longer they lived, the more they learned of the fame and reputation of the subject of the medallion. Those who came officially and actively in contact with many of the officers of the late Indian and Colonial Exhibition, were very gratified to find in what high esteem Daniel Hanbury was held, with what reverence his name was mentioned, and how thoroughly his work was appreciated by botanists throughout the world.

THE BOARDS OF EXAMINERS.

The usual letter from the Privy Council had been received, approving the appointment of the Examiners, as reported last month.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Gilson, Charles Boulter .....Margate.
Hilton, Ivor Ajax Robinson ...London.
Liverseege, John Francis .....Birmingham.
Rye, Frank ....Cannes (France).
Southall, Wilfred Francis .. ...Birmingham.

Chemists and Druggists.

The following, who were in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Thomas, Jonathan Jowett .....Garstang.
Waldie, Agnes .....Linlithgow.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society.

Flintan, Francis Robert .....Chertsey.
Oliver, Frederick Josiah .....Tunbridge Wells.
Thomas, Edward .....Rochdale.

ASSOCIATES.

The following having passed the Minor examination and tendered their subscriptions for the current year, were elected "Associates" of the Society:—

Barratt, George Frederick .....Penzance.
Blackham, William George ...Liverpool.
Calhaem, Richard Edmund Kean Bristol.
Cruickshank, Gavin Lang .....Aberdeen.
Cumming, John .....Portsoy.
Dalziel, Charles Michie .....Aberdeen.
Evans, Edgar Michael.....Cardiff
Hoare, Walter .....Christchurch.
Hindle, Joseph..... .....York.
Jennings, William Henry .....London.
Philp, William John Ignatius ..London.
Raffan, Robert .....Buckie.
Watson, Frederick Percy .....Lincoln.
Woolley, Samuel Walter.....Stamford.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Allanson, James .....Wishaw.
Andrews, Charles Russell .....London.
Aplin, John Henry .....Chard.
Averill, George .....Stafford.
Baker, Alfred .....March.
Baldwin, George Joseph.....Loughborough.
Bancroft, Charles Frederick ...Great Grimsby.
Barden, Tedbar ....Dewsbury.
Billington, Herbert Bennett ...Barnsley.
Blomfield, Francis Henry .....Braintree.
Bradbury, Charles .....New Fletton.
Butchart, Robert .....Edinburgh.
Clarkson, Joseph .....Skipton-in-Craven.
Cox, Matthew .....Bishop Auckland.
Cooper, Edwin .....Lincoln.
Crawley, William Pashler .....Oundle.
Crossling, Frank .....Newcastle-on-Tyne.
Davidson, James A. M. .....Aberdeen.
Davies, David Hughes .....Llanddewi Brefi.
Davis, Henry Baker .....Swansea.
Devereux, Arthur Edward ...Stoke-on-Trent.
Drackley, Thomas .....Coventry.
Emerson, Richard Wm. James.Hull.
Eyles, John Robert .....Newbury.
Foot, Wm. Rolstone Whiteway.Totnes.
Gallimore, James Samuel .....Tutbury.
Gautry, Frank ....Goole.
Goulding, Ernest .....Holloway.
Griffith, Edward .....Bodedern.
Gwillim, Walter Robert .....Abergavenny.
Harrington, William .....St. Bees.
Hindle, Robert George .....Wirksworth.
Jeffery, Elias.....Falmouth.
Kay, Harvey George ....Aberdeen.
Kirk, James Robert .....Rawcliffe.
Long, Sydney George Hadlow..Dover.

Macaulay, Donald .....Inverness.
Magor, Martin, Jun. .....Birmingham.
Medd, Frank Edward .....Gloucester.
Monks, Ernest ....Radcliffe.
Onyon, Ellis Atkin .....Lincoln.
Petter, Edward Arthur .....Folkestone.
Place, Edward Bland .....Pickering.
Rae, Robert Burns .....Lenzie.
Ralph, William .....Nairn.
Robins, Harry Hollies.....Dudley.
Roughton, Robert Wilkinson...Chester.
Salmon, John R. .....Coventry.
Scobell, Hubert William.....London.
Skipworth, Bertram George ...Grantham.
Sutherland, Alexander..... .....Pilrig.
Tollitt, William.....Liverpool.
Tottle, Samuel Harpham.....London.
Tudor, William.....Carmarthen.
Turton, Frederick William.....Liverpool.
Vincent, William... .....Truro.
Walker, Charles Herbert.... ....Hull.
Walker, David .....Edinburgh.
Walker, George B. .....Wellingborough.
Webber, James Wilkie .....Taunton.
Wilson, William Oliver .....Royston.
Williams, Timothy .....Carmarthen.
Woodman, Edward, Jun. .....Sutton.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

Restorations to the Register.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the "Register of Chemists and Druggists":—

Frederick Johnson, Wilford Road, Nottingham.
Benjamin Thomas Mills Neale, Sherston Magna, Wilts.

Addition to the Register.

The Registrar reported that—

Alfred Harrison, of Headingley, Leeds,

having made a statutory declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been duly supported, his name had been placed on the Register.

Reports of Committees.

FINANCE.

The report of this Committee was, on the motion of the President, received and adopted, and various accounts ordered to be paid.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£15 to the widow (aged 35) of a pharmaceutical chemist, a member and subscriber to the Benevolent Fund. She has three children, the eldest aged four. (Middlesex.)

£15 to a pharmaceutical chemist (aged 65), member from 1853 to 1885, and subscriber for several years to the Fund. Applicant was in business for twenty-seven years, but had to give it up after a long illness. (Surrey.)

£10 to the widow (aged 45) of a registered chemist and druggist. Applicant has had six previous grants. (Lancashire.)

£15 to the widow (aged 46) of a registered chemist and druggist. (Bucks.)

£10 to the widow (aged 30) of a registered chemist and druggist, who has three children, girls, dependent upon her, the eldest aged five. She is endeavouring to obtain employment as a nurse. (Wales.)

£5 to the widow (aged 56) of an associate from 1842 to 1845. Applicant has had ten previous grants, the last in August 1886. Has been very ill for the last two months. (Middlesex.)

One application had been adjourned for further inquiries, and three had not been entertained.

The Vice-President, in moving the adoption of the report and recommendations, remarked that in each case where the Committee had declined to entertain the application, ample reasons existed for the course taken.

Mr. Richardson desired to make an observation on the discussion which took place last month with reference to the administration of the Benevolent Fund. He should be very sorry for it to go forth, as he understood to be the purport of Mr. Symes's remarks on that occasion, that when once annuitants were placed on the Fund, there was no restriction on their future conduct. He believed, on the contrary, that every annuitant was strictly looked after, and in any case of unworthy behaviour, the name would be struck off.

Mr. Symes thought it was a pity to raise a fresh discussion on this subject. It was not his intention to convey what Mr. Richardson had stated, and as he read the report it conveyed exactly what he said. He merely wished to say that where the Committee made a casual grant, and thus sometimes helped the applicant over a period of difficulty, and prevented the necessity for a permanent grant, it had the advantage of thoroughly investigating the circumstances on each occasion. In the case of annuitants the most severe inquiry was made in the first place, and then it was taken for granted that the recipients would go on in the same way in which they had been going up to that time. If anything to the contrary came to the knowledge of the Committee, of course the annuity would be discontinued, but the Committee did not make fresh inquiries from year to year. That was all he meant to say, and he believed it was quite correct.

Mr. Woolley said he was very happy to say that through the exertions of Mr. A. Balmforth, a member of the Society in Manchester, the child of Mrs. Taylor had been successful in getting into the Commercial Travellers' School.

The President also mentioned that in the case of one of the applicants to whom a grant was made last month to complete the purchase money for an annuity, the annuity had been purchased.

The motion was then carried unanimously.

Mr. Bottle suggested, in reference to what fell from the President at the commencement of the business, that there was not quite sufficient touch between the scrutineers appointed at the meeting for the election of annuitants and the Council. It occurred to him that in future it would be well for the scrutineers to present a report to the Council.

The President said no doubt that would be the proper course.

The Society's Business in Scotland.

The President said a statement had been received from the Assistant-Secretary of the income and expenditure on account of the Society in Scotland for the past year, duly authenticated by the Honorary Treasurer. This, in accordance with the usual practice, he proposed to refer to the Finance Committee. Another report had also been received from the same source stating the work which had been done in various departments under his care during the year. This the President proposed should be referred to the Library, Museum, Laboratory, and House Committee.

This course was unanimously agreed to.

LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest	Lowest.	Average.
November	Day . .	393	26	7	15
	Evening .	154	17	2	7

Circulation of books.	Town.	Country.	Total.	Carriage paid.
November . .	130	154	234	£1 18 8½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

For the Library in London—

Allgemeiner österreichischer Apotheker - Verein, Zeitschrift, 1886. From the VEREIN.

American Druggist, [continuation of] New Remedies, 1886. From the EDITORS.

American Journal of Pharmacy, 1886.

Annual Announcement, 1886.

From the PHILADELPHIA COLLEGE OF PHARMACY.

Analyst, 1886. From the EDITOR.

Archiv for Pharmaci og technisk Chemi, Jan.-Feb., 1886. From the PUBLISHERS.

Asclepiad, 1886. From Dr. B. W. RICHARDSON.

Botanical Society of Edinburgh, Transactions, vol. 16, part 2. From the SOCIETY.

British and Colonial Druggist, 1886.

From the PROPRIETORS.

British Pharmaceutical Conference, Year-Book of Pharmacy and Transactions, 1885. 2 *copies.*

From the CONFERENCE.

Canadian Pharmaceutical Journal, 1886.

From the ONTARIO COLLEGE OF PHARMACY.

Chemical News, 1886. From the EDITOR.

Chemical Society of London, Journal, 1886.

— Abstract of the Proceedings, 1886.

— List, 1886. From the SOCIETY.

Chemist and Druggist, 1886.

Chemists' and Druggists' Diary, 1887.

From the PROPRIETORS.

Chemists' and Druggists' Trade Association, Tenth annual report, 1886. From the ASSOCIATION.

College of Preceptors, Calendar, 1886.

From the COLLEGE.

Drugs and Medicines of North America, 1886.

From Messrs. J. U. and C. G. LLOYD.

Guy's Hospital, Reports, vol. 43.

From the HOSPITAL.

Hamilton Association, Journal and Proceedings, vol. 1, part 2, 1885. From the ASSOCIATION.

Hooker, Flora of British India, part 13.

From H.M. GOVERNMENT.

Illinois Board of Pharmacy, Annual Reports, 1885-86. From the BOARD.

Illinois Pharmaceutical Association, Proceedings, 1885-86. From the ASSOCIATION.

Imperatorskie S. Peterburgskie Botanetsheskie Sad, Acta Horti Petropolitani, tom 9, fasc. 2.

From the SAD.

Institution of Civil Engineers, List of Members, 1886. From the INSTITUTION.

Kaiserliche Akademie der Wissenschaften in Wien, Anzeiger, mathematisch - naturwissenschaftliche Classe, 1886. From the AKADEMIE.

Linnean Society of London, Journal, 1886.

From the SOCIETY.

Mason Science College, Calendar, 1886.

From the COLLEGE.

Massachusetts State Board of Health, Sixth Annual Report, supplement, 1885. From the BOARD.

Massachusetts State Pharmaceutical Association, Proceedings, 1886. From the ASSOCIATION.

Middlesex Hospital, Reports for 1884.

From the HOSPITAL.

New South Wales, Department of Mines, Annual Report for 1885. From the DEPARTMENT.

New York State Pharmaceutical Association, Proceedings, 1886. From the ASSOCIATION.

Ny pharmaceutisk Tidende, Nos. 1-3, 1886.

From the PUBLISHERS.

Ohio State Pharmaceutical Association, Proceedings, 1885. From the ASSOCIATION.

Owens College, Manchester, Calendar, 1886.

From the COLLEGE.

Pharmaceutical Record, 1886. From the EDITOR.

Pharmaceutical Society of Ireland, Calendar, 1886.

From the SOCIETY.

Pharmaceutical Society of Australasia, Australasian Journal of Pharmacy, 1886.

—Annual Report, 1886. From the SOCIETY.

Pharmacie Centrale de France, L'Union pharmaceutique et le Bulletin commercial, 1886.

From the PHARMACIE CENTRALE.

Philosophical Society of Glasgow, Proceedings, vol. 17. From the SOCIETY.

Photographic Society of Great Britain, Journal and Transactions, 1886. From the SOCIETY.

Provincial Medical Journal, 1886.

From the PROPRIETORS.

Radcliffe Library, Catalogue of books added during 1885. From the LIBRARY.

Royal Botanic Society, Quarterly record, 1886.

From the SOCIETY.

Royal College of Physicians of London, List of fellows, etc., 1886. From the COLLEGE.

Royal College of Surgeons of England, Calendar, 1886. From the COLLEGE.

Royal College of Veterinary Surgeons, Register, 1886. From the COLLEGE.

Royal Dublin Society, Scientific Proceedings, vol. 4, parts 7-9 ; vol. 5, parts 1-2.

— Scientific transactions, vol. 3, nos. 7-10.

From the SOCIETY.

Royal Institution of Great Britain, Notices of the Proceedings, no. 79.

— Additions to the Library, 1882-86.

— List, 1885. From the INSTITUTION.

Royal Medical and Chirurgical Society of London, Proceedings, new ser., nos. 11-13.

— Additions to the Library, supplement 4.

— Medico-Chirurgical Transactions, vol. 69.

From the SOCIETY.

Royal Society of London, Proceedings, 1886.

From the SOCIETY.

St. Bartholomew's Hospital, Reports, vol. 21.

— Statistical tables for 1885. From the HOSPITAL.

Sei-I-Kwai, Medical Journal, 1885-86.

From the SOCIETY FOR THE ADVANCEMENT OF MEDICAL SCIENCE IN JAPAN.

Société botanique de France, Bulletin, 1886.

From the SOCIÉTÉ.

Société des pharmaciens de l'Eure, Bulletin, no. 12.

From the SOCIÉTÉ.

Société française de botanique, Revue de botanique, 1886. From the SOCIÉTÉ.

Society of Chemical Industry, Journal, 1886.

From the SOCIETY.

Timehri, vol. 5, part 1, 1886. From the EDITOR.

University College, Dundee, Calendar, 1886.

From the COLLEGE.

University College, London, Calendar, 1886.

From the COLLEGE.

University of Durham, Calendar, 1886.

From the UNIVERSITY.

University of Edinburgh, Calendar, 1886.

From the UNIVERSITY.

University of Glasgow, Calendar, 1886.

From the UNIVERSITY.

University of London, Calendar, 1886.

From H.M. GOVERNMENT and the UNIVERSITY.

Victoria, Pharmaceutical register for 1886.

From the PHARMACY BOARD OF VICTORIA.

Yorkshire College, Annual report, 1886.

From the COLLEGE.

Bert (P.), First Year of Scientific Knowledge, 3rd ed., 1886. From the PUBLISHERS.

Bastelaer (D. A. van), Brochures diverses, 1886.

From Mr. R. BREMRIDGE.

Flückiger (F. A.), Elementi di farmacognosia, 1886

— Notiz über das erste sauerstofffreie natürliche Alkaloïd und die Arariba-Rinde, 1886.

Flückiger (F. A.), Zur Geschichte der ältesten Beziehungen zwischen Ostasien und dem Abendlande, 1886. From the AUTHOR.

Hamberg (N. P.), Arseniksyrlighetens förändring i beröring med ruttnande animaliska ämnen, 1886. From the AUTHOR.

Laurentz (H.), Beitrag zum forensisch-chemischen Nachweis des Hydrochinon und Arbutin im Thierkörper, 1886. From Professor DRAGENDORFF.

Méhu (C.), Sur les urines sucrées, 1886. From the AUTHOR.

British Pharmacopœia, 1864.

Pharmacopœia Londinensis, translated by Tuthill, 1824.

Pharmacopœia Londinensis, translated by Phillips, 5th ed., 1848.

Smith (J. E.), Compendium Floræ Britannicæ, ed. quarta, 1825.

Browne (J.), Adenographia, a Treatise of the Glandules, 1684. From Mr. J. BAINBRIDGE.

For the Library in Edinburgh—

Australasian Journal of Pharmacy, Jan.-Feb., 1886. From the PHARMACEUTICAL SOCIETY OF AUSTRALASIA.

British and Colonial Druggist, 1886. From the PROPRIETORS.

Canadian Pharmaceutical Journal, 1886. From the ONTARIO COLLEGE OF PHARMACY.

Royal Society of Edinburgh, Transactions, session 1884-85 and 1885-86. From the SOCIETY.

Society of Chemical Industry, Journal, 1886. From Mr. J. R. YOUNG.

Sixieme Congrès International pharmaceutique, 1885, Compte Rendu, 1886. From Mr. R. BREMRIDGE.

The Committee recommended the purchase of the undermentioned books :—

For the Library in London—

Ganot, Elements of Physics, 12th ed.

Provincial Medical Journal.

Roberts, On the Digestive Ferments, 2nd ed.

Robinson, 500 Practical Trade Receipts, 4th ed., 1886.

Willson, Chemical Notes, 2nd ed., 1886.

For the Library in Edinburgh—

Beale, How to work with the Microscope, 5th ed.

Fownes and Watts, Manual of Chemistry, 13th ed.

Sutton, Volumetric Analysis, 5th ed.

The Committee recommended that the *Pharmaceutical Journal and Transactions* be forwarded regularly to the Ecole Supérieure de Pharmacie de Paris.

Museum.

The Curator's report had been received, and included the following particulars :—

Attendance during November.	Total.	Highest.	Lowest.	Average.
Morning .	347	22	4	13
Evening .	123	11	1	5

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

To the Museum—

From the Colonial and Indian Exhibition.

The whole exhibit of Messrs. A. S. Watson and Co. in the Hong Kong Court, comprising a series of medicinal oils, oil seeds, and other drugs ; a model of a sesamum oil apparatus, for preparing, crushing the seed, and expressing the oil ; a model of a medicinal seed oil press, and of a ground nut oil press ; a model of the apparatus used in the distillation of Chinese peppermint oil, a model of a mill used for grinding cosmetic powders, and specimens of cosmetics ; a Chinese mortar for preparing internal and another for external remedies, and a canoe-shaped mortar for powdering roots. From Messrs. A. S. WATSON and Co.

Specimens of very large quills of Calisaya bark grown in India ; sections of the trunks of *Cinchona officinalis* and *C. succirubra*, showing the method of renewing and mossing the barks, and sections of the trunks of *Cinchona micrantha* and *C. nitida*. From Dr. GEORGE WATT, India Court.

Specimens of the seeds, roots, and barks of some of the rarer medicinal plants of Ceylon. From Dr. H. TRIMEN, Ceylon Court.

Specimens of Balata milk, the seeds of *Cacoucia coccinea*, *Maximiliana Martiana*, and *Abrus precatorius*. From Mr. G. H. HAWTAYNE, Executive Commissioner, British Guiana.

The whole exhibit of Mr. W. Fresson in the British Guiana Court, including vanilla, isinglass, crab oil, balsam of copaiba, castor oil, cocoa nut oil, cassareep, etc. From Mr. W. FRESSON, Demerara.

The valuable collection exhibited by Dr. Brooks in the Seychelles Court, comprising very fine vanilla ; and the essential oils of cloves, cinnamon, neroli, verbena ; also, kino and other medicinal products prepared from plants cultivated in the Seychelles. Presented by Dr. BROOKS through Messrs. WRIGHT, LAYMAN and UMNEY.

Specimens of *Eucalyptus globulus* in flower. From Mr. E. N. BUTT.

Specimens of a Chinese blistering beetle (*Epicauta Gorhami*). From Messrs DAVY, YATES and ROUTLEDGE.

Specimens of essential oil of sweet basil and ecuelled oils of bergamot, limes, and shaddock fruits. From the MONTSERRAT CO.

To the Herbarium—

A collection of about 150 medicinal plants of the Mauritius, lately exhibited in the Mauritius Court at the Colonial and Indian Exhibition. From the SUPERINTENDENT of the Woods and Forests Department, Mauritius.

A select series of excellently preserved specimens of South African medicinal plants, from the Cape of Good Hope Court. Presented by Dr. ANDREW SMITH, of the Lovedale Mission, South Africa.

A second series of about 150 beautifully prepared specimens of British plants. From Mr. J. W. WHITE, Clifton.

The following donations to the Museum of the Society in Edinburgh had been reported by the Assistant Secretary, Mr. J. Rutherford Hill.

Specimens of the sulphocarbolates of barium, cadmium, cobalt, copper, lithium, manganese, nickel, strontium, and borophenol. From Messrs. CRACE-CALVERT and Co., Manchester.

Professors Bentley and Attfield had attended and reported on their respective classes.

The Committee had further considered the application for a grant from the Aberdeen and North of Scotland Society of Chemists and Druggists, and recommended that a grant of £50 be made.

It was further recommended that £50 be allowed to Professor Dunstan towards expenses in connection with research work in the Octagon Laboratory during the ensuing year, and that he be requested to furnish a report of his work at the end of the year.

The PRESIDENT, in moving the adoption of the report, said the most important item was the grant of £50 to Aberdeen. It was a source of gratification to him that after having considered the subject further with the assistance of material furnished by the Secretary of the Aberdeen Society, the Committee was able unanimously to recommend that this grant should be made. He was the more gratified because Aberdeen was a long way from London; in fact it was a long way from anywhere, as far as he knew. Aberdeen was almost a special part of the kingdom of Scotland, and therefore it was pleasant

to feel that in this way the Council was able to put itself in touch educationally with the brethren in Aberdeen. The Committee was thoroughly satisfied that extremely good work was being done in Aberdeen, and as an instance of what he considered the right way of carrying on local associations, he might mention that having taken larger premises and otherwise enlarged their operations, each member of the Association had agreed to double his annual subscription. The Council always made grants with greater pleasure when it found that local effort was active, and he was quite sure the Aberdeen Association would appreciate this grant.

The motion was then carried unanimously.

The PRESIDENT then read a letter which he had received from Mr. Bosisto on his departure for Australia, enclosing a handsome photograph of himself, and expressing his thanks for the good offices and attention which he had received at the hands of the Council during his stay in England. The President said he was sure the best wishes of the Council would go with Mr. Bosisto, and they would all hope that in the future, as in the past, he would do good work for pharmacy in Australia. Mr. Bowen, the President of the Pharmaceutical Society of Australasia, who had also returned, had desired him to express his acknowledgments for the courtesy he had received, and to him also they would all wish Godspeed on his return to his adopted country.

A letter had been received from Mr. Stephen, of the Victoria Dispensary, Hong Kong, asking for a copy of his certificate of having passed the Minor examination, the original having been lost.

The PRESIDENT explained that it was impossible to accede to this request, but there would be no objection to the Registrar sending Mr. Stephen a certificate of his having passed his examination and being on the Register, which would answer every legal purpose.

BUILDING.

The report of this Committee stated the steps which had been taken for the protection of the back portion of the adjoining premises, in consequence of the pulling down of the old buildings. The architect had submitted plans for the new premises in Pied Bull Yard, under which the laboratories could be placed on the top floor, and the Examination Hall on the ground floor. The Committee having carefully considered this plan, and compared it with the one previously submitted, considered that the balance of advantage was in favour of No. 2, and recommended that it be adopted. It further recommended that tenders be invited from eight or ten builders.

The Council went into committee to discuss this report, and inspect the plans. After a full discussion the report and recommendations of the Committee were unanimously adopted.

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor, stating the progress of cases which had been placed in his hands.

George Walker, late of Hurst, Ashton-under-Lyne, had confessed judgment for a penalty.

C. J. Jarman, 27, Montague Street, Lower Broughton, Manchester, had been ordered to pay two penalties and costs.

— Hull, Dock Street, Monkwearmouth, had been ordered to pay two penalties and costs.

J. M. Rhodes, Post Office, Penge Road, S.E., had paid £5 5*s.* for penalty and costs, without the case going into court.

Israel Nuttall, Lee Lane, Horwich, near Bolton, had paid £5 as penalty, without the case going into court.

Several fresh cases of alleged infringement of the Pharmacy Act had been considered by the Committee, in some of which immediate proceedings were recommended.

The Council went into committee to receive and consider this report.

On resuming, the report and recommendations were unanimously adopted.

LAW AND PARLIAMENTARY.

The PRESIDENT stated that though notice of a report from the Committee had been placed on the agenda, it had been found that the Committee was not yet in a position to report, the draft bill which had been prepared being found to require alteration in some respects. He hoped that it would be ready for consideration at the next meeting of Council.

REPORT OF EXAMINATIONS.

December, 1886.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (9th)	5	5	0
„ (15th)	5	3	2
	—10	—8	—2
Minor (9th)	26	8	18
„ (10th)	28	9	19
„ (15th)	27	7	20
„ (16th)	30	17	13
„ (17th)	30	11	19
	—141	—52	—89
	151	60	91

Preliminary Examination.

Eight certificates received in lieu of the Society's Examination :—

2 College of Preceptors.
1 Society of Apothecaries.
2 University of Cambridge.
3 „ „ Oxford.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The sixth meeting of the ninth session was held in the Society's House, 36, York Place, on the evening of Wednesday, December 22, at 9.15. In the unavoidable absence of the President and Vice-President the chair was taken by Mr. W. S. Turnbull, Ex-President.

The minutes of last meeting having been read and confirmed, the Chairman called upon Mr. A. M. Macdonald to read a paper on "Light, Natural and Artificial; its Properties and Uses."

Mr. Macdonald treated the subject at considerable length, and in a lucid and interesting manner; dealing with the nature and sources of light, and the theories and laws by which its various phenomena are explained. Speaking of the electric light he said it was undoubtedly the light of the future, and gave some interesting particulars showing the state of perfection to which this means of lighting had been brought in its adaptability to the lighting of dwelling houses and public buildings.

On the motion of the Chairman a cordial vote of thanks was unanimously awarded to Mr. Macdonald.

The Chairman then called upon Mr. Hill to read a "Note on some Recent Donations to the Herbarium." One of these was a fine specimen of *Lycopodium clavatum*, in the spore-bearing condition, from the wildest part of Aberdeenshire. Another was a specimen in flower and fruit of *Vaccinium Vitis-idæa*, interesting as being one of the adulterants of *Arctostaphylos Uva-ursi*. The specimen showed the spotted under-surface of the leaf, with its slightly crenate and distinctly revolute margin, and

also the inferior fruit, by which *Vaccinium* may be known from *Arctostaphylos*. It was mentioned that the herbarium had now been arranged in natural orders, and could be consulted by members of the Association.

Thereafter specimens of aceto-tartrate and glycerinite of aluminium, sulpho-icthyolate of ammonia, and Unna's gelatine and zinc paste containing 2 per cent. of the sulpho-icthyolate were shown.

The Chairman intimated that the next meeting would be held on Wednesday, January 12, and would be devoted to "Notes and Queries," under the charge of Mr. Macdonald.

Parliamentary and Law Proceedings.

Alleged Fatal Mistake in Dispensing by a "County Drug Company."

The adjourned inquest on the body of Frank Downes Dodwell, aged two years and four months, was resumed at Cheltenham, before Mr. E. W. Coren, coroner, on Monday. Mr. W. Heath appeared to watch the case on behalf of Mr. James Dudgeon,* the assistant who made up a certain powder administered to the child.

The father of the child stated that it was a healthy child from the date of its birth, and had never had an illness until Sunday fortnight last, when it appeared to be suffering from a cold in the head. On the following day the cold appeared to have removed to the chest, and the same evening Mr. Dighton, surgeon, was called in to see the child. A prescription was given, and witness took it to Mr. Hands, chemist, of High Street, Cheltenham, and he gave witness four powders and a bottle of mixture. Mr. Dighton directed that the child should be put in a hot bath, which was done, and as soon as the powders were procured one of them was given to the child, as directed by the doctor. Another powder was to be given to the child about six o'clock on the following morning unless he became more "croupy," in which case the powder was to be given earlier. A dose of the mixture was given to the deceased about an hour after the first powder was administered. About a quarter of an hour after the child had taken the powder he vomited; the mixture appeared to ease the throat a little, but made not much perceptible difference in his condition. Between five and six o'clock on the Tuesday morning another powder was given to the deceased, and that also caused the child to vomit. Mr. Dighton came on the Tuesday afternoon, between three and four o'clock, and saw the deceased again. Two of the four powders were then in hand, and Mr. Dighton directed witness to give the child one of the remaining powders at once—which was done—and also directed a powder to be given every four hours. The fourth powder was given between eight and nine o'clock the same evening, and another hot bath was also administered. Mr. Dighton had increased the number of powders from four to seven, on the occasion of the last-mentioned visit, and between five and six in the evening witness took the prescription to the County Drug Company, in the High Street, and obtained seven powders from that Company's shop. Witness gave the deceased the last of the four powders which Mr. Hands had made up before opening the packet containing the seven powders supplied by the Drug Company. He received the prescription (produced) back with the seven powders. One of the seven powders was given to the child about two o'clock on Wednesday morning. On opening the powder he remarked to his wife how much smaller it was than those which had been supplied by Mr. Hands. Witness mixed up the powder with a little water, and he saw his wife give it to the child. Almost directly the child had taken this powder he began to get drowsy. [Witness here observed that after the the child had taken the last of Mr. Hands's powders, from which he vomited, he became much better, and would not go to sleep till between eleven and twelve that night.] The child could not vomit after taking the first of the powders supplied by the Drug Company, but gradually got worse. Witness directed his wife to use the means he described to the jury to make the child vomit, but the child was unable to do so, becoming quite purple in the face in the attempt. Between four and five the same morning deceased opened his eyes, which by this time had become quite glazed, and the pupils of which were almost invisible. Mr. Dighton was then fetched, and he came soon after five the same morning. On opening one of the powders, Mr. Dighton, he believed, remarked that there appeared to be some mistake, and requested witness to go with him to the Dispensary. Witness went, and the doctor gave him three other powders for the deceased. These powders were administered at intervals of four hours during the day. Towards midday deceased became a little better, but grew worse an hour or two later; he seemed to be in a state of semi-consciousness all day. Mr. Dighton came again about one o'clock the same day, when he told witness that the powders were evidently wrong, and sealed the five remaining powders, together with the prescription, and forwarded them to the county analyst for analysis. On this occasion Mr. Dighton gave witness another prescription for more powders, and a liquid mixture; one dose of this mixture was given to the deceased between four and five o'clock, but none of the powders were given. As far as he could tell, the mixture did not have any effect upon the child, who remained in a partially unconscious state till his death. Witness's wife gave milk and port wine to the child while it was in this state. At eight o'clock Mr. Dighton again came to see the child, and tried to bring on vomiting, but did not succeed. Directly Mr. Dighton had left—about nine o'clock—the child had a turn for the worse, and at a quarter to eleven the same night he died.

Cross-examined by Mr. Heath: Deceased was taken with croup on December 20. He was quite sure he had not given the first of the powders received from the Drug Stores before it went to sleep on the Tuesday night. The child lived for twenty-one hours after taking the powder from the Drug Store.

Mr. A. A. Dighton, surgeon, said he was first called in to see the deceased on the evening of Monday, the 20th ult., and found the child suffering from croup. Witness prescribed for the child, among other things, four powders containing 10 grains of ipecacuanha. He ordered one of the powders to be taken at once, to be followed in an hour by a dose of a mixture, and the powder to be repeated if the child became more croupy. A hot bath was ordered, a linseed poultice was ordered to be applied to the throat, and milk and port wine were to be given. He saw the child on the following afternoon, and finding it was going on well, he ordered seven powders to be sent instead of four, one of which was to be taken every four hours. The powders were prescribed as emetics. On the Wednesday morning, about 5.15, witness was again called in to see the deceased, and found him in a semi-comatose condition; the pupils of his eyes were dilating slightly, and responded slightly to light. His breathing was heavy, and witness immediately asked who dispensed the powders. Witness took one of the powders and remarked that he was afraid there had been a mistake, and that he should take one of the powders away to analyse it. He also got the father of the child to accompany him to the Dispensary, where he gave him three powders of the right sort to go on with. Before leaving the house witness ordered the child some castor oil. Each of the three powders referred to contained 10 grains of ipecacuanha and nothing else. Between that time and when he next saw the child he tested the contents of the powder he took away from the house, and came to the conclusion that it was not the sort of powder he had ordered. At about mid-day the same day he saw the child, when he

* This name is not to be found in the Register of Chemists and Druggists.

appeared to be better than in the morning, being conscious ; the pupils of the eye dilated and freely acted to light. Some fresh powders of the same nature as those previously ordered were again ordered, and witness then told the father of the child that something was wrong in the powders supplied by the Drug Store. Witness received from the deceased's father a box of five powders, which he labelled and forwarded to the county analyst, accompanying it with a letter in which he stated : "I should be obliged if you will test the enclosed powders, as I believe that instead of being pulv. ipecacuanhæ, as ordered by me, they are pulv. ipecacuanhæ co. If this is the case, I shall leave it in your hands." About eight on the same evening he saw the deceased again, and found him in a very exhausted condition, and perspiring profusely. Witness tried to produce vomiting, but failed, and the child died the same night. Compound ipecacuanha powder would contain sulphate of potash, ipecacuanha, and opium, while an ipecacuanha powder would contain ipecacuanha only. The compound powder would not be a proper powder to give to a child suffering from what the deceased suffered from. Opium would be a very improper thing to administer to the deceased. The effect on a child in the condition of the deceased who had taken one of the compound powders would be drowsiness, contracted pupils of the eyes, profuse sweating, and the passing into a state of unconsciousness.

The Coroner: Supposing the child to have taken a compound powder containing a grain of opium, would that be likely to have caused or accelerated the death of the child?—It might have caused the death of the child.

Would it have accelerated death?—It would have retarded his recovery.

Is a grain of opium a fair dose for a child of the age and condition of the deceased?—It is an unheard-of dose.

Is the prescription you have written a perfectly clear and intelligible prescription to any dispenser of medicine?—Yes.

Is there anything in the prescription that could possibly induce any dispenser to make up a compound powder for a simple one?—Certainly not.

Cross-examined: Croup is a serious malady, and recovery depends upon the severity of the attack. I should say that the relapse that this child suffered was the result of taking the powder supplied by the Drug Company, the injurious part of which was the opium. It was unusual for a child to have lived twenty-one hours after taking a grain of opium. An ordinary ipecacuanha compound powder for an adult would contain from 5 to 10 grains of opium. The ordinary Pharmacopœia dose of opium is from ½ a grain to 3 grains.

Mr. Heath drew attention to the fact that in the prescription the word ipecacuanha was contracted to ipecac., with a full stop after the seccnd c—which was a large one—and asked if that might not have been taken for "ipeca co."

Witness: Certainly not; if lawyers read dots for o's there is no knowing what they will do. I should think that any dispenser, knowing the close similarity between pulv. ipecac. and pulv. ipecac. co., would take extra care in reading the prescription and dispensing the same.

Cross-examination continued : Unfortunately my medicine did not act after the powder supplied by the Drug Company had been taken. The symptoms after taking the powder were not all those of croup, neither were there any symptoms of croup sufficient to cause the death of the child when I last saw it—two hours before death. It was an unusual thing for the symptoms of opium to have continued so long in the child. It is a common thing in the cases of opium poisoning for the persons affected to get better and then to have relapses, according to Taylor's 'Medical Jurisprudence.' The medicine I prescribed for the child on December 22, was "ipecacuanha wine 2 minims, antimony wine ½ a minim, glycerine 10 minims, water a teaspoonful ; one teaspoonful every four hours." The powder was "pulv. ipecac., grains 10 ; send 4." I should not order a "pulv. ipecac. co." powder every four hours.

By the Coroner: In my opinion the great exhaustion of the child was the cause of death. The powders which I prescribed would not have produced exhaustion to such an extent as was the case in this child. The taking of the compound powder, added to the condition of the child, would have increased the exhaustion. If my prescriptions and orders had been carried out, and no other powder given to the child beyond those I prescribed, in my opinion the child would have recovered.

Kate Teall, in the employ of Mr. Dighton, proved the posting of a box and letter from her master to Mr. Embrey, county analyst.

Gertrude Eliza Dodwell, mother of the child, corroborated her husband's evidence.

Cross-examined: One dose of the mixture, three powders, and a dose of castor oil were given to the child on the day of its death.

Mr. George Embrey, county analyst, gave the result of his analysis of the five powders forwarded to him by Mr. Dighton. He first proved the nature of each powder, then mixed them, and then made a quantitative analysis of the whole. The percentage composition of the powders was 77·5 parts of potassium sulphate, and organic matter 22·5. The organic matter consisted approximately of opium and ipecacuanha powder in equal proportions. The five powders weighed 61 grains, or a little over 12 grains each. There would be more than 1 grain of powdered opium to each powder, which, as far as his information went, would be a large dose for a child. He should say the prescription produced was a very clear and legible one ; although not an expert in reading prescriptions, he read it the first time he saw it. Witness had made an analysis of the contents of the stomach of the deceased (received from P.S. Woolford), together with the brain, part of the liver, and kidney. The stomach contained a very small quantity of fluid. Witness specially searched for potassium sulphate and opium, and found traces of both. The quantity of opium was very small ; he could not estimate the amount.

Cross-examined: Opium was in the stomach, but how much I cannot say.

At this stage the inquest was adjourned till Monday next, at half-past-two.—*Cheltenham Examiner.*

Conviction under the Sale of Food and Drugs Act.

At the Westminster Police Court, on Monday last, Mr. William Aston, pharmaceutical and dispensing chemist, of 36, Sloane Square, Chelsea, appeared to a summons before Mr. Partridge, at the instance of the Vestry of Chelsea, charging him with selling a compounded drug, namely, iodide of potassium solution, not in accordance with the prescription of the purchaser, the inspector under the Foods and Drugs Act. A second summons was for the offence of selling a drug not of the nature, quality and substance demanded.

The inspector employed by the Vestry said that the medical officer of the parish, Dr. Seton, who was also the appointed analyst, had found that there was considerable carelessness in making up prescriptions at chemists', and by his direction a prescription for a mixture of 90 grains of iodide of potassium, and 6 ounces of water was left with the defendant to make up. The result of analysis was the discovery that there was only 71 grains of the drug used in the preparation, or 19 short of the number prescribed.

The defendant thought that technically he was not in a position to question the accuracy of the analyst's certificate ; but he was quite unconscious that any inaccuracy occurred in making up the prescription.

Mr. Partridge thought it was of the utmost importance that doctors' prescriptions should be dispensed with absolute accuracy, and fined the defendant 20*s.* and 4*s.* costs.

Obituary.

ALFRED BISHOP.

We regret to have to record the dealth, somewhat suddenly, of Mr. Alfred Bishop, of Speck's Fields, Mile End New Town. The name of Mr. Bishop has been long associated with the manufacture of granular preparations, the most popular of which, known as "granular citrate of magnesia," was first introduced by him upwards of a quarter of a century ago. Before that time, we believe, Mr. Bishop travelled for one or two wholesale houses, and he was at one time employed as an assistant in the house of Dinneford and Co., New Bond Street. Mr. Bishop was an examined pharmaceutical chemist and a man of great perseverance and very considerable practical experience. He became a Member of the Pharmaceutical Society in 1859, and was always a loyal supporter of it, as well as a munificent donor to the Benevolent Fund.

Notice has also been received of the death of the following :—

On the 20th of December, Mr. William John Jones, Pharmaceutical Chemist, Newland Terrace, Kensington, London. Aged 63 years. Mr. Jones had been a Member of the Pharmaceutical Society since 1845.

On the 25th of December, Mr. Alderman Henry Gilham Martin, Fishpool, St. Albans. Aged 60 years. Mr. Martin was formerly in business as a Pharmaceutical Chemist in St. Albans, and was then a Member of the Pharmaceutical Society. He took an active part in local affairs, and was elected to the civic chair in 1869.

Correspondence.

**** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

SIR JOHN LUBBOCK'S SHOP HOURS REGULATION BILL.

Sir,—Upon perusing your report of the admirable paper read by Mr. Magor at the last meeting of the Midland Counties Chemists' Association, one cannot help being struck by the favourable impression Sir John Lubbock's Bill has produced on the minds of our brethren in the Midland Counties; but, it is deeply to be regretted that the far-seeing and much esteemed President should consider "compulsory closing at eight o'clock" to savour of "grandmotherly legislation," and perfectly absurd to talk of it as an infringement of the liberty of the subject, especially, when the hours of labour of the working classes have to a considerable extent been regulated by legislation, which doubtless has had the support of many members of Parliament, holding the same political opinions as Mr. Barclay, whose place of business, I imagine, is not kept open till nine or ten o'clock at night.

That our grandfathers and perhaps grandmothers "mixed paint at six a.m., and found something to do at eleven p.m.," is surely not a sufficient reason, why, in these days of progression—when chemists must be abreast of the time—the present generation should have their noses to the grindstone fourteen hours a day.

Two blacks do not make a white; and if our noble ancestors were so particularly partial to long hours, and had the idea that the smell of paint at six a.m. would give them an appetite for breakfast, or that powdering aloes, or some such agreeable occupation, at eleven p.m. would make them sleep soundly and have pleasant dreams, this would surely not be an argument against the Shop Hours Regulation Bill; neither does it follow that we of more enlightened days should be deprived of all social intercourse and recreation, because they were foolish enough to spend their days in mere drudgery.

To me it appears that the narrow-mindedness and petty trade jealousy, which at present are so common with many of our brethren of the mortar and pestle, may be attributed to a great extent to the want of association with their fellow men, which the unreasonably long hours of business prevent their enjoying.

The Vice-President, in the recent discussion at Birmingham, also objected to compulsory closing, yet I have no doubt he is in favour of the examinations as at present existing, and perhaps of a compulsory curriculum. For my part, I have always found that chemists could never mutually agree to close early for any length of time; some would invariably break any arrangement which might have been agreed upon. Yet why we should work all hours of the day, and frequently be called up during the night, whilst men in other stations of life, with less responsibility and much better remuneration, should work about eight hours a day, I can scarcely understand.

The Shop Hours Regulation Bill is undoubtedly a step in the right direction, and my earnest hope is that it may soon be placed on the statute books of the realm, and that the author of so beneficial a measure may thus add another claim to be regarded as one of the benefactors of his time.

43, *Green Lane, Liverpool.* D. A. F.

MR. LEE'S SUGGESTION.

Sir,—In your issue of November 20, I noticed a letter, signed James Lees, Oldham, suggesting how to deal with unqualified men; and have been waiting to see if some more able writer of letters than myself would take the matter up. So far no one has, although it is a subject that should have brought forward numerous opinions. I, for one, cordially agree with Mr. Lees's suggestion, and should have a circular issued in even stronger language than he suggests. The time has arrived when something should be done to prevent unqualified men carrying on precisely the same business as ourselves, with this small difference, we are licensed to sell "poisons," they are not. And pray how much a year do we turn over in "poisons?" with the risk of some lunatic putting an end to himself by poisoning, and then have to be censured by a coroner for not being more careful, although, perhaps, after having carried out the Poisons Act to the letter. Although the unqualified are not supposed to sell poisons, I have no doubt they all keep them in stock for prescribing; and if they know their customer well, would not hesitate in selling them. The other day I had a bottle brought to my shop bearing a label "Paregoric," labelled "Poison," etc., etc., which had been supplied by an unqualified man. Now, one of two things is certain in this case; either the man was breaking the law by selling a poison, or he was liable under the Food and Drugs Act for selling an article which was not genuine. I do not suppose the Society has power to prosecute under the Food and Drugs Act, but it would be doing both the public and the chemists a great service by urging the proper authorities to do so. There are thousands of shops in the large towns where a preparation composed chiefly of water and burnt sugar is sold as paregoric. Unfortunately, the public in the lower-class neighbourhoods do not know but they are getting the genuine article; neither do they know the difference between a qualified chemist and an unqualified one, so long as he has his shop stocked with bottles, and sells all the sundries usually sold by chemists. To carry out Mr. Lees's suggestion would be the only means of teaching the ignorant public the difference.

In a few days I shall have the pleasure of having one of these "drug stores" not a hundred yards from my own shop, although the neighbourhood is already well stocked with chemists.

I hope some more of the readers of this Journal will take the matter up, and keep the ball rolling until we get something done to compensate us for the cost of our title.

Hull. A. P. S.

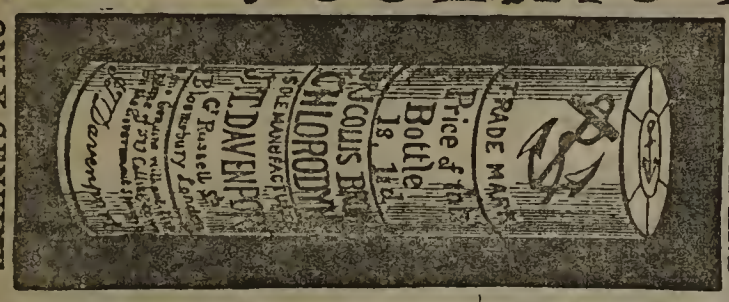
[*** The difficulty in obtaining a conviction for the sale of "paregoric" containing no opium was illustrated in a case reported last week, before, p. 543.—ED. P. J.]

Ignorans.—The questions for the Jacob Bell Scholarship Examination are set every year by the examiners appointed by the Council to conduct the examination. The questions set for the last examination will be found before, p. 302.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Burroughs, Wellcome and Co., Shillinglaw, Sajoux, Thompson, Botham, Elborne, Pharmaceutical Chemist, J. K.

THE ORIGINAL AND ONLY GENUINE.

DR. J. COLLIS BROWNE'S CHLORODYNE

ONLY GENUINE.  ORIGINAL AND

IS THE GREAT SPECIFIC FOR CHOLERA, DIARRHŒA, DYSENTERY.

COUGHS, COLDS, ASTHMA, BRONCHITIS.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Dr. J. C. BROWNE (late Army Medical Staff) DISCOVERED a REMEDY to denote which he coined the word CHLORODYNE. Dr. Browne is the SOLE INVENTOR, and, as the composition of Chlorodyne cannot possibly be discovered by Analysis (organic substances defying elimination), and since the formula has never been published, it is evident that any statement to the effect that a compound is identical with Dr. Browne's Chlorodyne *must be false.*

This Caution is necessary, as many persons deceive purchasers by false representations.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

DIARRHŒA, DYSENTERY. GENERAL BOARD of HEALTH, London, REPORT that it ACTS as a CHARM, one dose generally sufficient. Dr. GIBBON, Army Medical Staff, Calcutta, states: "2 DOSES COMPLETELY CURED ME of DIARRHŒA."

From SYMES & Co., Pharmaceutical Chemists, Simla. *Jan.* 5, 1880.

To J. T. DAVENPORT, London.

DEAR SIR,—We congratulate you upon the widespread reputation this justly-esteemed medicine has earned for itself all over the East. As a remedy of general utility, we much question whether a better is imported, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances *ad infinitum* of the extraordinary efficacy of DR. COLLIS BROWNE'S CHLORODYNE in Diarrhœa and Dysentery, Spasms, Cramps, Neuralgia the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than Collis Browne's, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than Collis Browne's is a deliberate breach of faith on the part of the chemist to prescriber and patient alike.—We are, Sir, faithfully yours, SYMES & CO., *Members of the Pharm. Society of Great Britain, His Excellency the Viceroy's Chemists.*

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IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

FURTHER IMPORTANT NOTICE.

The subjoined list of eminent Firms concur with Vice-Chancellor Sir W. Page Wood's statement in Court that Dr. Collis Browne was undoubtedly the Inventor of Chlorodyne; and that when Chlorodyne, or the Original Chlorodyne, is ordered, they invariably supply Dr. J. Collis Browne's:—

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Allen, Hanbury & Co.	,,	Gale & Co.	London.	Newbery & Sons	,,
Baiss Brothers	,,	Giles & Son	Clifton.	Oldham, G., & Co.	Dublin.
Banks & Richards	Birmingham.	Goulding, Messrs.	Cork.	Parsons & Richardson	Leicester.
Barron, Harveys & Co.	London.	Grattan & Co.	Belfast.	Peake, Allen & Co.	Dublin.
Bell, John & Co.	,,	Grimwade, Ridley	London.	Raimes & Co.	Edinburgh.
Corbyn & Co.	,,	Grindley & Son	Chester.	Sang & Barker	,,
Cox & Gould	,,	Hearon, M'Culloch & Co.	London.	Sanger, J., & Sons	London.
Curling & Co.	,,	Hodgkinson, Tonge & Stead	,,	Sim, James, & Co.	Aberdeen.
Davy, M'Murdo & Co.	,,	Hopkins & Williams	,,	Smeeton, W.	Leeds.
Dobbin, W., & Co., Limited	Belfast.	Hovenden, R., & Sons	,,	Southall & Co.	Birmingham.
Drew, Barron & Co.	London.	Johnson, J. H. & S.	Liverpool.	Sutton, W., & Co.	London.
Drew, B., & Alexander	,,	Langton, W., & Co.	London.	Tomlinson, Hayward & Co.	Lincoln.
Dunn & Company	,,	Lynch & Co.	,,	Treacher, Hodgkinson & Co.	London.
Edwards, W.	,,	Mackay, John, & Co.	Edinburgh.	Westwood & Hopkins	,,
Evans, Lescher & Webb	,,	Mander, Weaver	Wolverhampton.	Woolley, James	Manchester.
Evans, Gadd & Co.	Exeter.	Marsden & Sons	London.	Wyleys & Brown	Coventry.
Ferris & Co.	Bristol.	Maw & Son	,,	Yates & Co.	London.
Foulger, S., & Son	London.	Meggeson & Co.	,,		

After these public statements in a Court of Equity, and subsequent confirmation by the trade at large, no Chemist can conscientiously use or sell any other compound for Chlorodyne, without committing a breach of faith, unjust to patient and physician. The *value* of the remedy *alone* creates the great demand.

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The Original Preparation of the Inventor,

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Sold by all Chemists in Large-sized Bottles (the 1s. size containing just double the quantity usually sold at same price) at 1s., 2s. 6d. and 3s. 6d. each.

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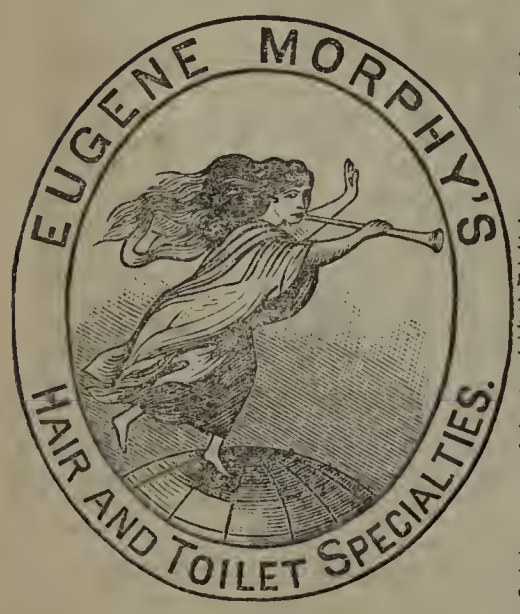

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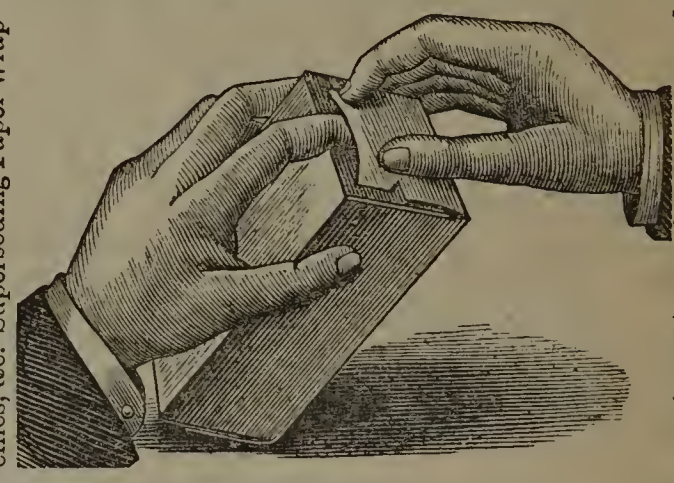

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5	by	2½	wide,	2/-	5	by	3	wide,	2/3
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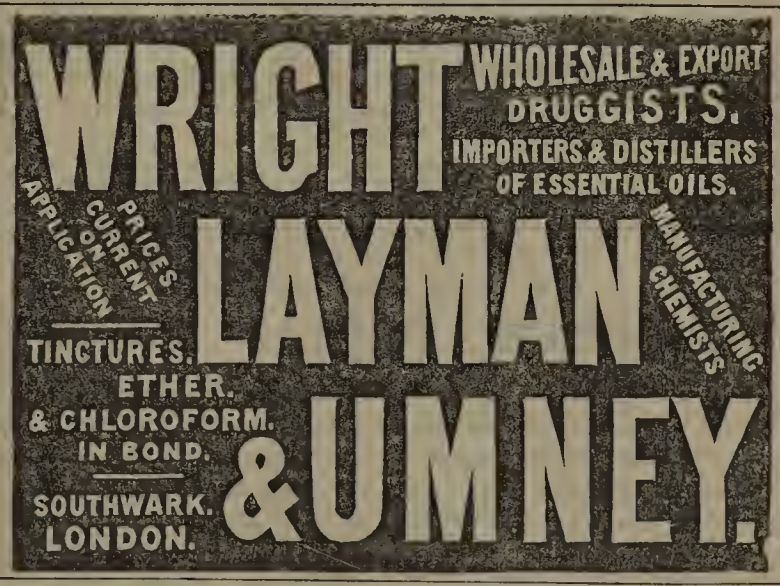

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Mr. A. G. Everard
„ M. Hargrave
Mr. W. Martin
„ W. W. Smee

MINOR.

Mr. J. L. Armitage
„ T. E. B. Blankley
„ J. R. Bentley
„ W. J. Baker
„ J. M. Carter
„ R. E. K. Calhaem
„ W. H. Cockle
„ A. J. Colley
„ J. Davies
„ G. A. Davis
„ A. P. Evans
„ J. Garibaldi
Mr. E. C. F. Green
„ H. S. Heath
„ J. W. Heath
„ M. Hill
„ J. Hewitt
„ J. Ll. Lewis
„ A. M. MacDougall
„ H. P. Matthews
„ C. A. Marrett
„ H. E. K. Pinson
„ A. J. Pratt

PRELIMINARY.

Mr. H. W. Baker
„ S. Green
Mr. F. R. Mitchell
„ C. G. Rackham

(DECEMBER) MAJOR.

One Student only presented himself and passed.

Mr. C. B. Gilson.

MINOR.

Mr. G. W. Barratt
„ W. H. Burrell
„ G. W. Blankley
„ J. F. Cole
„ H. W. Day
Mr. J. W. Hickinbottom
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The Pharmaceutical Journal AND Transactions.

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Aloes Barb. B.P.	5 gr.	5	0	16	0
,, Dilute (Hall's Dinner)		5	0	16	0
,, Socotrine, B.P.	5 gr.	5	0	16	0
,, and Asafœtida, B.P.	5 gr.	5	0	16	0
,, and Iron, B.P.	5 gr.	5	0	16	0
,, and Myrrh, B.P.	3 gr.	5	6	18	0
,, ,, ,,	5 gr.	6	0	20	0
,, Nux Vomica		6	0	20	0
Aloin	1-10 gr.	5	0	16	0
,,	1-4 gr.	6	0	20	0
,,	1-2 gr.	7	0	24	0
,,	1 gr.	11	0	39	6
,, Compound		7	0	24	0
,, and Strychnine		7	0	24	0
,, Strychnine and Belladonna		7	0	24	0
Anti-Cholera	2 gr.	7	0	24	0
Anti-Dyspepsia (Fothergill's)		7	0	24	0
Aphrodisiac		16	0	59	6
Arsenious Acid	1-50 gr.	5	0	16	0
,, ,,	1-20 gr.	5	0	16	0
Asafœtida, U.S.		5	0	16	0
,, Compound, B.P.	5 gr.	5	0	16	0
Atropine	1-300 gr.	7	0	24	0
,,	1-100 gr.	7	0	24	0
Blue Mass, B.P.	1 gr.	5	0	16	0
,, ,,	2 gr.	5	0	16	0
,, ,,	3 gr	5	0	16	0
,, ,,	5 gr.	5	6	18	0
,, ,, Colocynth and Hyoscy		9	0	32	0
Calcium Sulphide	1-10 gr.	6	0	20	0
,, ,,	1-4 gr.	6	0	20	0
,, ,,	1-2 gr.	6	0	20	0
,, ,,	1 gr.	6	0	20	0
Calomel, Colocynth, and Hyoscyamus		9	0	32	0
,, Comp. B.P.	5 gr.	5	6	18	0
,, and Opium		7	6	26	0
Camphor and Hyoscyamus		5	6	18	0
,, Mono-Bromated	2 gr.	11	0	39	6
Cannabis Indica Extract	1-4 gr.	7	0	24	0
,, ,, ,,	1-2 gr.	9	0	32	0
Cascara Sagrada Extract	3 gr.	7	0	24	0
Cathartic Compound U.S.P.		5	6	18	0
Codeine	1-2 gr.	20	6	79	0
Colocynth Comp. B.P.	4 gr.	8	0	28	0
,, ,, ,,	5 gr.	9	0	32	0
,, ,, and Blue Mass	5 gr.	9	0	32	0
,, ,, and Calomel	5 gr.	9	0	32	0
,, ,, and Hyoscy, B.P.	5 gr.	9	0	32	0
,, ,, Extract, B.P.	5 gr.	9	0	32	0
Conium Compound, B.P.	5 gr.	5	0	16	0
Copaiba Compound		5	6	18	0
,, and Oloe-Resin Cubeb	5 gr.	11	0	39	6
Corrosive Sublimate	1-30 gr.	5	0	16	0
,, ,,	1-20 gr.	5	0	16	0
,, ,,	1-10 gr.	5	0	16	0
Croton Chloral	1 gr.	10	0	36	0
,, ,,	2 gr.	17	0	63	6
Cubeb, Oleo Resin, with Soda		7	0	24	0
Digitalin	1-60 gr.	7	0	24	0
Elaterine	1-20 gr.	13	0	47	6
Emmenagogue (Mutter's)		5	6	18	0
Ergotin	3 gr.	16	6	63	0
Euonymin	2 gr.	16	0	59	0
,,	3 gr.	20	6	79	0
,, Compound		16	0	59	0
Ferruginous (Blaud's)	3 gr.	6	0	20	0
,, ,,	5 gr.	7	0	24	0

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Iodoform	1 gr.	9	0	32	0
,, and Iron		11	0	39	6
Ipecac. Powdered	1-4 gr.	5	0	16	6
,, ,,	5 gr.	5	0	16	0
,, Comp. (Ipecac. and Opium)	5 gr.	9	0	32	0
,, and Squill, B.P.	5 gr.	5	0	16	0
Iron Arseniate	1-8 gr.	5	6	18	0
,, Carbonate, B.P.	5 gr.	5	6	18	0
,, by Hydrogen (Quevenne's)	1 gr.	5	0	16	0
,, Iodide (Blancard's Formula)	1 gr.	7	0	24	0
,, and Quinine Citrate	2 gr.	10	0	35	6
,, Quinine, and Strychnine		13	6	49	6
Laxative Vegetable (Improved Cath.)		5	6	18	0
Manganese, Bin-oxide	2-gr.	9	0	32	0
Mercury, Bin-Iodide	1-16 gr.	5	0	16	0
,, Proto-Iodide	1-8 gr.	5	0	16	0
,, ,,	1-4 gr.	5	0	16	0
Morphine, Muriate	1-8 gr.	7	0	24	0
,, ,,	1-4 gr.	9	0	32	0
Narcotic Extracts (Brown-Sequard)		15	0	55	6
Nitro-Glycerin	1-100 gr.	7	0	24	0
,,	1-50 gr.	7	0	24	0
Opium, Powdered	1 gr.	7	0	24	0
,, and Acetate of Lead, B.P.	5 gr.	7	0	24	0
,, and Camphor		7	0	24	0
Pepsin, Pure Concentrated	1 gr.	9	0	32	0
Phosphorus	1-000 gr.	6	0	20	0
,,	1-50 gr.	6	0	20	0
,,	1-30 gr.	6	0	20	0
,, and Iron		8	0	28	0
,, Iron and Quinine		17	0	63	6
,, and Nux Vomica		7	0	24	0
,, Nux Vomica and Iron		8	0	28	0
,, and Quinine		17	0	63	6
,, Quinine, Iron, & Strychnine		17	0	63	6
,, and Valer. Zinc		11	0	39	6
Picrotoxin	1-80 gr.	7	0	24	0
Podophyllin	1-8 gr.	5	0	16	0
,,	1-4 gr.	5	0	16	0
,,	1-2 gr.	5	6	18	0
,, Comp.		8	0	28	0
Quinine, Bi-Sulphate	1-4 gr	5	0	16	0
,, ,,	1-2 gr.	5	0	16	0
,, ,,	1 gr.	5	0	16	0
,, ,,	2 gr.	7	6	26	0
,, ,,	3 gr.	10	6	38	0
,, ,,	4 gr.	13	0	48	0
,, ,,	5 gr.	16	0	60	0
,, Sulphate	1-4 gr.	5	0	16	0
,, ,,	1-2 gr.	5	0	16	0
,, ,,	1 gr.	5	6	18	0
,, ,,	2 gr.	8	0	28	0
,, ,,	3 gr.	11	0	40	0
,, ,,	4 gr.	14	0	52	0
,, ,,	5 gr.	17	0	64	0
,, Comp. (Anti-malarial)		15	0	55	6
Rhubarb Comp., B.P.	5 gr.	7	0	24	0
,, ,, and Blue Mass	5 gr.	7	0	24	0
Rhubarb, Ipecac. and Soda		7	0	24	0
Salicylic Acid	2 gr.	7	0	24	0
,, ,,	5 gr.	11	0	39	6
,, Comp.		16	6	63	0
Soap Comp., B.P.	5 gr.	8	0	29	0
Squill Comp., B.P.	5 gr.	5	6	18	0
Strychnine	1-50 gr.	5	0	16	0
Zinc. Phosphide	1-4 gr	7	0	24	0
,, ,,	1-2 gr.	9	0	32	0
,, Valerianate	1 gr.	8	6	30	0

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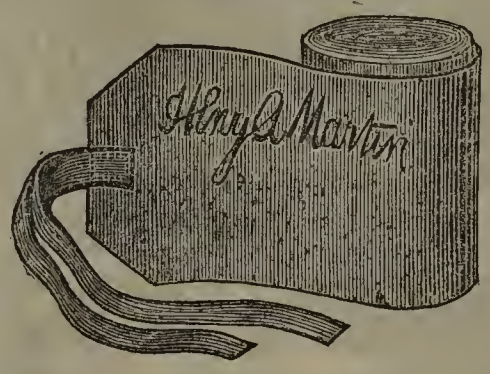

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THE AMOUNT OF CAFFEINE IN VARIOUS KINDS OF COFFEE.

BY DR. B. H. PAUL AND A. J. COWNLEY.

Having recently had occasion to determine the amount of caffeine in several samples of coffee, for the purpose of comparison, it became necessary in the first place to make some experiments in order to ascertain what method could be relied upon for furnishing uniform and constant results. By extracting the beans with boiling water, completely precipitating the clear liquid with subacetate of lead, then removing any excess of lead from the filtrate and evaporating to a small bulk the caffeine may be obtained in a crystalline condition; but it is still very impure, and the recrystallization, after pressing between bibulous paper, so readily gives rise to loss that this method cannot be relied upon to give accurate results. It is, moreover, extremely tedious and troublesome. Dr. James Bell* recommends as a better method the extraction of coffee beans mixed with magnesia by boiling with strong alcohol, evaporating off the spirit and treating the residue with water to dissolve the caffeine. In this way a considerable portion of the colouring material is separated by the magnesia, and a further quantity is got rid of by evaporating the aqueous solution to dryness with a further quantity of magnesia, and then dissolving the caffeine in hot benzol. We have not, however, found this method to give more satisfactory results than the previous one, and one circumstance that greatly interferes with its application to coffee is the considerable amount of fat present in the bean. After several attempts to modify these methods of treatment for the determination of caffeine in coffee beans we had recourse to the use of lime as a means of separating the tannic acid while dissolving out the caffeine by boiling with alcohol. For this purpose it is advisable to mix the finely powdered coffee with moist lime and then to extract the mixture in a continuous percolator of the kind described by Waitt in this Journal (vol. xiv., p. 376). The alcohol is then evaporated off and the dry residue is mixed with some water and a few drops of dilute sulphuric acid, the addition of which has the effect of separating the fat and clarifying the solution by converting a small quantity of soluble lime salt into calcium sulphate. After filtering the cooled liquid it is quite free from fat, and may then be evaporated to obtain the caffeine in a crystalline state. A better plan, however, is to extract the caffeine from the solution by shaking it with chloroform, in which it is freely enough soluble to be readily taken up, and on evaporating off the chloroform caffeine will be obtained in a condition fit for weighing. The principal points to be observed in carrying out this operation are the acidification of the water solution from the spirit extract and the shaking with chloroform, but with proper care very uniform results can thus be obtained. We have hitherto been in the habit of operating upon 50 grams of coffee beans in each experiment, but after confidence in the method has been obtained and experience in operating a much smaller quantity might be taken.

On applying this method to the determination of caffeine in various samples of coffee we were at first somewhat perplexed by the great discrepancy of the published statements as to the amount of this constituent that is present, as will be seen from the following quotations:—

	Caffeine in raw coffee beans per cent.
Robiquet	0·32 to 0·64
Liebig	0·23 to 0·46
Zenneck	0·75
Graham, Campbell and Stenhouse	0·88 to 1·00
Dragendorff	0·99 to 1·22
Squibb	1·00 to 1·03
Bell	1·08 to 1·11
Allen	0·50 to 2·00

The discrepancy between the data given as applying to roasted coffee is still greater, and in the *Allgemeiner Kaffee Zeitung* for 1884 the amount of caffeine in roasted coffee is stated to range from 2·00 to 3·64 per cent.

The first result with which we were struck on carrying out a number of experiments with several different samples of raw coffee beans was the very narrow range within which the amount of caffeine appeared to vary. Instead of being a varying amount, it was more nearly a constant quantity in those kinds of coffee beans we had an opportunity of examining, which were the following:—

	Caffeine per cent.
Coorg	1·10
Guatemala	1·18
Travancore	1·16
Liberian	1·20
„	1·28

In making these determinations the raw coffee berries were not dried, but taken just as they came to hand and powdered. A difference in the amount of water might therefore have altered the amount of caffeine in the dry material, but there is not much reason for expecting that the foregoing data would have thus been materially affected. It would be desirable to extend these determinations of caffeine to a number of other samples of coffee from various sources, and it is to a great extent with the hope of obtaining samples for examination that we now make known the results that have been so far arrived at. In a future communication we propose to deal with the determination of some of the other constituents of coffee.

The above determinations were all made with unroasted coffee, and it may be added that in experiments with roasted coffee we found a similar uniformity in the results obtained, so that a determination of the amount of this constituent may probably furnish a means of detecting the adulteration that is now so largely practised in the sale of ground coffee according to the custom that is general in this country. It has been stated that in the ordinary roasting of coffee the caffeine is to a great extent volatilized and lost. We have strong reason for believing that this statement is entirely incorrect, for in a number of experiments made by roasting coffee beans in which the amount of caffeine had been previously determined in the raw state we ascertained that there was an increase in the amount of caffeine in the roasted coffee and that this increase was uniformly proportionate to the loss of weight experienced by the coffee in roasting. As a general rule the amount of caffeine in pure roasted coffee is about 1·3 per cent. This may be more or less to some slight extent, according as the coffee is slightly or highly roasted, but there did not appear to be any evidence of the volatilization of caffeine during roasting.

* 'Analysis and Adulteration of Foods.' Part I., p. 16.

HISTORICAL RESEARCHES ON LOBELIA INFLATA.*

BY J. U. AND C. G. LLOYD.

Did the Indians use *Lobelia inflata*? Sir William Johnson, preceding the year 1800, bought a cure for syphilis from the Indians, which turned out to be the root of *Lobelia syphilitica*. It is asserted in most medical works that the American Indians used *Lobelia inflata*, but this assertion is not supported by the testimony of any writer that we can find who was acquainted with the medicines employed by the Indians, and the pioneer travellers of America failed, Schoepf excepted, to refer to the plant. We, therefore, conclude that these writers have confused the *Lobelia syphilitica* of Johnson with *Lobelia inflata*. We call attention to the facts that—

Bartram, a careful observer, who describes a number of plants and trees, omits it.

Carver (whose statements are often overdrawn), who describes the plants, trees and medicines of the tribes among whom he travelled, neglects it.

Lewis and Clark speak of the use of the vapour-bath, but do not mention that *Lobelia inflata* was used by the Indians of the upper Mississippi. In 'The Expedition to the Sources of the Missouri,' Lewis and Clark, vol. ii., pp. 135 and 136, speaking of syphilis, say :—"When once a patient is seized the disorder ends with his life only," but (p. 136) they state of the Chippewa Indians that "their specifics are the root of the lobelia and that of a species of sumach." It is evident that this is not from observation, as the Chippewas (also known as the Ojibwas) were not the Western Indians. They embraced "many formidable tribes" about the great lakes. Into their country Sir W. Johnson extended his treaties, and the statement of others regarding *Lobelia syphilitica* is evidently accepted by Lewis and Clark as authority.

The 'Book of the Indians,' by S. G. Drake (Boston, 1837), a very unique publication, gives no instance of its use or of any other emetic by the Indians.

The paper on "Indian Medicine," by J. M. Browne ('Indian Miscellany,' p. 74. Edited by W. W. Beach, 1877) does not refer to a substance that can be identical with lobelia. Major Long, 1819, in his account of the medicines and practice of the Indians of the West, evidently knew nothing of *Lobelia inflata*.

Professor Nuttall informed Dr. Mattson that in his excursions among the Indians he had never known them to use *Lobelia inflata*.

The interesting narratives in 'Indian Captivities' contain no record of *Lobelia inflata*, although rich in the experiences of persons who passed many years among the Indian tribes east of the Mississippi.

Samuel Stearns, M.D., 1772, in his 'American Herbal,' mentions other species of lobelia, but not *Lobelia inflata*, and he makes no reference to the Indians using an emetic. Dr. Stearns was a native of Massachusetts and travelled among the Indians of that State with intent to study their remedies, and would not have omitted this plant if it had come under his observation. Neither Schoepf, Barton or Rafinesque mentions *Lobelia inflata* from personal experience as an Indian remedy, and none of these authors would have neglected it if aware of its being in use.

Catlin ('Manners, Customs and Conditions of the North American Indians,' vol. i., p. 186), in his explicit description of Indian customs, omits it.

However, Mattson, in his 'American Vegetable Practice,' states that "there is abundant traditionary evidence that it was used by the Penobscot Indians long before the time of Dr. Thomson, its reputed discoverer; but with the exception of that tribe, I have not been able to discover by any research I have made that the American aborigines have any knowledge of its properties or virtues." Mattson, however, neglects to give any positive testimony or refer to any authority.

Therefore, from authorities quoted, and numbers of other works searched without avail, we conclude that the evidence is altogether against the reiterated assertion that *Lobelia inflata* is a drug handed down to us from the American Indians. We cannot find proof of a single instance where it was employed by them. If the Penobscot Indians used the plant, as Dr. Mattson believed (from tradition), it is possible that the adjacent settlers learned of its properties from them; but we would more rationally accept that the early use of *Lobelia inflata* in domestic medicine was an accidental discovery of the whites. Those were days of heroic remedies. Bleeding, emetics and blisters were the methods of treatment, and it is not to be presumed that so remarkable and common an emetic as lobelia could remain unknown. That Thomson and Cutler learned of its emetic properties by independent personal experience is undeniable, we think, Thomson especially insisting that he stumbled upon it; and there is no evidence at our command to support the supposition that the whites learned of its properties from the Indians, or that the Indians used it in medicine.

It is a common belief with some persons that the Indians used the lobelia in connection with their "sweat baths," to clear their minds and remove their ailments, but our endeavours to find the authority for such statements have resulted in failure. The "medicine men," it is true, in their incantations pretended sometimes to throw up bones, by which the future was foretold, but this, if not a deception, had no connection with lobelia.

Samuel Thomson introduced Lobelia.

Cutler, 1785 ('Account of Indigenous Vegetables," American Academy of Sciences, 1785, p. 484), mentions that lobelia is emetic, saying, in reference to chewing the leaves of the herb, "at length they bring an extreme nausea and vomiting. . . . . A plant possessed of such active properties, notwithstanding the violent effects of chewing the leaves, may possibly become a valuable medicine;" but he knew nothing of its use in medicine. He afterwards states again that he was not then acquainted with its medical properties, for he writes to Dr. Thacher ('The American New Dispensatory,' Thacher, p. 147, 1810):—"When I was preparing my botanical paper, I had given it [lobelia] only a cursory examination. . . . . Accidentally ascertaining its emetic property, I inserted it with the specific name, 'emetic weed.'" Cutler afterwards used it in asthma, and refers to the fact that a Dr. Drury of Marblehead, Mass (most of the writers of the regular medical profession refer to Cutler and Drury as the first writers on the use of lobelia; they do not give historical credit to an irregular), used it in asthma by advice of a friend (doubtless this friend was a Thomsonian), and many medical writers have given credit to Cutler and ignored Thomson. Long before this, Thomson had become celebrated in the use of lobelia, and Thacher so admits indirectly, for he writes in the same paper as follows :—"The melancholy consequences resulting from the use of *Lobelia inflata*, as lately administered by a noted empiric." The trial of Thomson was in 1809, and good authorities of the regular profession have often since admitted that the first use of lobelia was by irregular practitioners. Thus, Pereira writes (Pereira's 'Materia Medica,' 1854, vol. ii., p. 538):—"After having been for some time used by quacks it was introduced to the notice of the regular profession by the Rev. Dr. Cutler, of Massachusetts," and Christison and Griffith agree that "it had long been used previously by the savages" (this is questionable) "and empyrics" (Christison and Griffith's 'Dispensatory,' 1848, p. 637).

Conclusion: Samuel Thomson introduced lobelia to medicine; he made it conspicuous and himself notorious in connection therewith. The assertions that Cutler and Drury introduced *Lobelia inflata* are not substantiated by the record.

* From advance sheets of 'Drugs and Medicines of North America,' the *Druggists' Circular*, January.

Did Thomson discover its Properties.

Thomson asserts that ('New Guide to Health,' p. 16): "Some time in the summer, after I was four years old (1773), I discovered a plant which had a singular branch and pods. The taste and operation produced were so remarkable that I never forgot it. I afterwards used to induce other boys to chew it, merely by sport to see them vomit. I tried this herb in this way for nearly twenty years, without knowing anything of its medical virtues. This plant is what I have called the emetic herb." (*Ibid.*, p. 27.)

Thus it seems that Thomson understood the emetic nature of *Lobelia inflata* before 1798, but he asserts that (italics our own) "*I have tried this herb in this way for nearly twenty years without knowing anything of its medical virtues.*" He further admits this by saying: "The herb which I discovered when but four years old I had often met with, but it had never occurred to me that it was of any value in medicine until about this time [1793], when moving in the field with a number of men one day, I cut a sprig of it and gave it to the man next to me, who ate it" (giving account of the action). "I have since found by twenty years' experience, in which time I have made use of it in every disease I have met with to great advantage, that it is a discovery of the greatest importance."

Thus Thomson admits that he knew nothing of the use of lobelia in medicine preceding 1793, and the first record we have of his making use of it in asthma is in 1807, to wit:—"In the fall of 1807 I introduced lobelia, tinctured with spirit, as a remedy in asthma."

Mattson, 1841 ('The American Vegetable Practice,' Mattson, vol. i., p. 164), states, however, that "it was used as a remedy by many people in New England long before his [Thomson's] time." He recounts as follows:—

"Mr. Phillip Owen, now eighty years old, relates that when a boy he was sent into the field by his mother to collect some lobelia for a child sick with the quinsy, and that the herb, administered in the usual manner, afforded a speedy and entire relief." This would show a use of it at about 1770.

"Mr. William Coburn, who also reached his eightieth year, says that lobelia has been used as a medicine in the State of Maine, both by the people and the Penobscot Indians, ever since he can remember, which is a period of not less than seventy years." This also carries the use back to 1770.

"Dr. John A. Hyde, of Freeport, Maine, then (1841) a very old physician, says that the people in that vicinity were in the habit of using lobelia under the name of colic weed when he first settled in the town, which was about fifty years ago. He says they employed it in various complaints, but particularly in colic, and considered it perfectly safe and harmless." This carries us back to 1790, and antedates Thomson again.

Dr. E. Harlow, of New Lebanon, Conn., writes under date of May 15, 1835, to a gentleman in Boston:—"I commenced the vegetable or botanic practice of medicine about 1796, under the instruction of Dr. Root, of Canaan, Conn., who was esteemed an able botanic physician. He made use of lobelia under the name Indian tobacco, and taught me the use of it, and from that period to the present I have continued to employ it in my practice. I may also state that Dr. Forbes, of Lebanon, used it when I was a boy, and from that circumstance it received the name of 'Forbes weed.'"

And lastly, "Doctress Charity Shaw Long, of Albany, N.Y., secured a patent for the use of *Lobelia inflata* in 1812, which was one year in advance of Thomson's patent."

Thus, from evidence that is entitled to credence, it seems that lobelia was somewhat known as a domestic medicine when Thomson was one year old, and there is little doubt that its use in domestic practice long antedated any positive information that can be found in print at this late day. Nevertheless, Thomson introduced it to medicine, and none will dispute that Samuel Thomson made lobelia a familiar name to hundreds of thousands of Americans; that he made it notorious none can deny. Whether the domestic use of lobelia by a few persons could have served to give Thomson a start with his "practice" is a question of little moment. He distinctly asserts that such was not the case, and that he discovered and introduced lobelia independently of all others. In our opinion his statement is entitled to credence. He was intensely enthusiastic on the lobelia subject, and, when writers on medicine ignored his claims, to give credit to Cutler and Drury, he considered it an act of injustice, and he expresses himself on the subject as follows:—"They cannot produce a single instance of its having been employed as a medicine till I made use of it" (Thomson's 'Materia Medica and Anatomy,' 13th edition, p. 585). This tendency to neglect him and, as he believed, to persecute him for opinion's sake, finally induced Thomson to seek Government protection, both for legal use and for monetary considerations, resulting in "Thomson's Patent."

Summary.

1. *Lobelia inflata* was not used by the Indians as a medicine.

2. It was employed in domestic practice and by botanics in New England before Samuel Thomson's day.

3. Samuel Thomson introduced *Lobelia inflata* to the public, and there is no evidence to show that he did not discover its emetic properties independently of all other persons.

4. The assertion that Cutler and Drury discovered the medicinal uses of *Lobelia inflata* and introduced the plant is not supported by the evidence.

NOTES ON PYRETHRIN.

BY C. J. S. THOMPSON.

The root of the *Anacyclus pyrethrum*, or pellitory of Spain, has long been used in medicine for its well-known properties as a sialalogue and local irritant. Its fusiform root that breaks with a resinous fracture, with its radiated structure and black spots, cannot easily be mistaken.

In earlier times it was official in the majority of the pharmacopœias of Europe, in which it formed an active ingredient, in numerous stimulating powders, tinctures, and gargle.

The root owes its irritating properties to its active principle pyrethrin, or pyrethric acid, a very acrid resinous substance, which resides mostly in the cortical portion. A good sample of pellitory will yield about 5 per cent. of pyrethrin. On analysis, the root is found to contain, besides pyrethrin, an acrid resin, volatile oil, yellow colouring matter, tannin, gum, and inulin. Pyrethrin is a soft dark brown resinous substance, having an unpleasant odour, and extremely hot and pungent to the taste. A very minute quantity placed on the tongue causes a strong burning sensation, which shortly increases, and remains for a considerable time, inducing a copious flow of saliva. A strong solution painted on the skin causes a sharp prickling sensation, and reddens the part where it has been applied. If the part is kept covered, a blister will be produced. Pyrethrin may be obtained by evaporating a washed ethereal extract, or the following more satisfactory method may be employed. Reduce the root to a coarse powder, and exhaust it by means of percolation with alcohol. Acidulate the percolated powder with acetic acid, and boil with more alcohol, and filter; mix the liquids and evaporate.

It is soluble in ether and alcohol, and readily soluble in oils or acetic acid. Pyrethrin is composed of an acrid, brown, resinous substance, which is soluble in alcohol, but insoluble in water and strong alkaline solutions; and a dark yellow oil, which is soluble in alkaline solutions. This oil is not nearly so acrid as the brown resinous matter, and it is probable that what burning taste it possesses is due to a small quantity of the resin being mixed with it.

SUNSHINE RECORDING.

The following communication upon the subject of "Sunshine Recording," from Mr. Richard Reynolds, has appeared in the *Leeds Mercury*:—

In introducing the subject of Sunshine Recording, it is proper to say a word or two upon some early endeavours to estimate variations in solar radiation. Pouillet constructed apparatus to accomplish this object by observing the heating effect upon a known quantity of water, whilst Sir John Herschel made a large thermometer filled with solution of ammoniacal sulphate of copper, and later he devised the black bulb thermometer *in vacuo*. But none of these, nor a multitude of the results of other attempts at indicating solar radiation, can lay claim to achieving the measurement of the duration of sunshine. Especial mention seems due to the inventions of Mr. T. B. Jordan, who, in 1838, published an account of his automatic daylight or sunshine recorder in the report of the Royal Cornwall Polytechnic Society. The instrument consisted of two metal cylinders, one revolving on the other. Round the outer surface of the inner cylinder was a sheet of sensitized photographic paper, whilst the outer cylinder revolved by clockwork once in twenty-four hours, being pierced by an opening, which constantly faced the sun. The distinctions between the action of bright sunshine and diffused daylight were only those of degree in the tinge conveyed to the paper. By a simple contrivance the cylinder was slightly altered in position daily, so that the paper could receive the records of a week. It is not surprising to learn that the same inventor tried the experiment of fixing a disk of sensitized paper upon the hour-hand of a clock, covering it by a metal plate with one perforation.

Campbell's Recorder.

It was in 1854 that the late Mr. T. F. Campbell, of Islay, conceived the idea of using as a lens a hollow glass sphere filled with acidulated water, in fact, an ordinary engraver's globe. This was mounted in the centre of a cup of mahogany, so that the sun's rays were focussed on the interior of the cup and charred it. By the happy notion of employing a sphere Mr. Campbell avoided the necessity of providing mechanical movements, as the earth's rotation accomplished the needful progressive track. When Mr. Campbell described his instrument to the Royal Meteorological Society in 1857 he reported an improvement in the substitution of a solid glass ball for a hollow sphere. Observations were commenced so early as 1854, when a recorder was placed on the roof of the General Board of Health in Whitehall, and here the record was maintained for twenty years. The diameter of the sphere used was 5¼ inches, and the hemispherical cavity in the block of mahogany was just large enough to receive the sphere. As the position of the concentrated rays of sunshine not only varied from hour to hour, but from day to day throughout the year, the same point on the interior surface of the bowl never charred twice. Each block lasted for six months. It is interesting to note that the forty bowls bearing the records of twenty years' observation, from 1854 to 1874, were placed in the hands of Professors Roscoe and Balfour Stewart, who estimated the relative degrees of carbonization by filling the cavities with a mixture of beeswax and olive oil. The result shows a much greater effect from the sunshine of the second half of the year than from that of the first half. Comparing annual periods, the years 1856 and 1857 showed a minimum value of solar-heat action. Professors Roscoe and Stewart call attention to this result in connection with the minimum of sun-spot action in 1856. In the years 1859 and 1870 they find a correspondence of maximum value of solar-heat with a maximum of sun-spot action. ('Proc. Royal Soc.,' xxiii., 578.)

Stokes's Recorder.

In 1875 the record was taken over by the Meteorological Office, cards in metal frames being substituted for the wood; and in 1880 the various stations were supplied with the modification devised by Professor Stokes, which is still considered to be the best form of scorching sunshine recorder. These observations have now been regularly taken at forty-two stations in Great Britain and Ireland, and in most cases cover a period commencing with the year 1880. York is a station, and the observer, Mr. J. Edmund Clark, B.Sc., states that the scorch begins the moment that the sun shines clearly, even if the card be damp. Soot may be deposited on the glass sphere and may require washing off. Rain serves to cleanse the sphere, and is free from objection. Frost and snow demand careful attention to the instrument. One unlooked-for caution has been given to observers—Beware of jackdaws! These birds have sometimes carried off the cards (as at Parsontown). But the use of Stokes's bright sunshine recorder did not become general among meteorologists. The cause was chiefly their cost; it must also be added that this "trap for sunbeams" permits some of them to escape. A hazy condition of the atmosphere, or the intervention of light cirrus cloud, suspends the scorching of the card, although the sun may be manifestly shining, and presumably exercising a great effect on the health and spirits of animals, and possibly on the life of plants also.

Jordan's Recorder.

The latest invention for sunshine recording depends, not on the heat rays of the spectrum, but on the action of the more actinic rays. Again a Mr. Jordan is the inventor, but this time it is Mr. Jas. B. Jordan, son of the Mr. Jordan already named as an investigator in the year 1838. Mr. Jas. B. Jordan, of the Home Office, Whitehall, is well known for his arrangement of the Glycerine Barometer of the *Times* newspaper. Jordan's Sunshine Recorder is a marvel of simplicity. It consists of a short cylindrical dark chamber, round the inner surface of which a sheet of sensitized photographic paper can be placed. The paper supplied has been prepared by a modified ferrocyanide or cyanotype method, and is ruled across its shortest diameter by lines for the hours, and sub-divisions for each period of ten minutes. The cylinder can be adjusted for any latitude, a scale by which to regulate its inclination being attached. It is set up with its lower end facing due south. When the sun shines in the forenoon, a ray of bright sunshine enters by a short and narrow slit on the east side of the cylinder, and reaches the paper, travelling along it by virtue of the earth's rotation. At noon the sunlight can no longer find access by this aperture, but it begins to enter by a corresponding opening on the west side of the cylinder, and continues to have access on this side as long as the sun is above the horizon.

In the sheets of prepared paper there are holes corresponding with these openings in the cylinder. After exposure for the day, the sensitized paper is removed from the cylinder, and (without exposure to direct daylight) is laid in cold water, face downwards, for ten or fifteen minutes, and then dried between blotting paper. This is the only fixing required, and they are now permanent. The time may be shortened by placing the dish under a tap of running water, when six minutes will suffice for fixing, and it is a good plan to remove the paper to an inclined glass plate to dry. It will then be found that any bright sunshine has left its evidence by a band of blue colour of varying intensity, according to the degree of brightness of the sunshine. The band for the morning will end not later than the line marked 12 on the paper, and the afternoon record will be a distinct track on another place. It is easy to reckon up the total amount of bright sunshine thus recorded.

Comparison of the different Instruments.

The different principles represented by Stokes's and Jordan's recorders respectively have already been alluded to. Some comparative trials have been made between instruments placed side by side, with the result that the photographic recorder showed about 11 per cent. more

bright sunshine than the scorching instrument. This is sufficient to prevent the indifferent employment of either instrument for furnishing returns that are afterwards to be collated. The scorching recorders are already represented by a fairly adequate number of stations. It is to be hoped that Mr. Jordan's simpler and much less costly instrument will receive the support of meteorologists.

Deductions from the Records.

Mr. R. H. Scott, F.R.S., President of the Royal Meteorological Society, in a valuable paper on "The Measurement of Sunshine" (*Quarterly Journal of Royal Meteorological Society*, July, 1885), has tabulated the results of the Stokes's recorder, as observed at the forty-two stations already alluded to.

Having recorded the actual hours of bright sunshine, its relation to the possible duration of sunshine for the period concerned must be reduced to a percentage value. The following results have been given by Mr. Scott for some typical stations :—

Mean Annual Percentage of Possible Sunshine.

Jersey	39
Pembroke and Geldeston (Norfolk)	35
Douglas	34
Bournemouth	33
Cambridge and Dublin, Parsonstown and Valentia	33
Oxford	31
Aberdeen	30
Silloth and Kew	29
Stonyhurst	27
Greenwich and Stornoway	26
Orkneys	24
Glasgow	22

Mr. Scott's leading deductions are as follows :—

1. The extreme south and south-west stations are the sunniest, Jersey standing first in this respect.

2. That in late autumn and winter Ireland is much sunnier than great Britain.

Respecting the periods of maxima, May is the sunniest month, and in the most favoured districts the percentage is then 50 (in Jersey 60). June and July show a falling off. In the late autumn the Midlands and Lincolnshire show the greatest deficiency. But the averages are taken from too short a period of years (five or less), and it may be expected that larger experience will extend and amend these deductions.

Local Variations.

Mr. Edge has published some comparative results for two stations, twenty-seven miles from each other, and differing in elevation. For these stations he traces the general result that although the higher station is deficient in sunshine in the forenoon, it "invariably" exhibits an excess of sunshine over the lower station during the afternoon. Local peculiarities of this kind deserve careful study.

Present Position and Prospects of the Subject.

It may be asserted that a good beginning has been made by the accumulation of the records already referred to. The subject is the latest addition to the science of meteorology, and already a standard mean value has been obtained by the observations of the five years 1881 to 1885, soon to be increased by the records of a sixth year. The Meteorological Office, in its 'Weekly Weather Report,' the summary of which is also published by the *Times* newspaper, records sunshine as well as temperature and rainfall. It compares this record with the mean value, indicating its + or − variation, and groups the stations into ten districts, of which one-half are chiefly grazing and the others arable land. By the report now before me, for the week ending November 8, 1886, it is shown that for the first eleven months all the stations (excepting North Scotland) exhibit a deficiency on the mean percentage varying from 1 (32 per cent. instead of 33 per cent.) in East Scotland to 5 (29 per cent. instead of 34 per cent.) in South Ireland. Now the subject appears to be specially open to fallacy if the number of stations in a district is inadequate to give a fair average. For example, the London values are at present the mean of observations at Bunhill Row, Kew Observatory, and the Meteorological Office, Victoria Street. I am able to give the results obtained at two stations in Leeds, during the months of October and November, by Jordan's photographic recorder. The first are those taken at the Philosophical Hall, under the care of Mr. W. Eagle Clarke, and the others have been observed by Professor Miall, at Cliff Road, Headingley. The first conclusion to be drawn from noticing them is that several stations should contribute their records before a mean value for Leeds could be formulated. So far as they go, the local story they tell is this :—In October the Philosophical Hall returned 6 per cent. of actual sunshine on the possible figure, and 5 per cent. in November. At Cliff Road, Headingley, October gave 8 per cent., and November showed 10½ per cent. A singular side-issue is raised when comparisons are made between the eight Sundays comprised in the period. When these are compared, the mean average deficiency of 40 per cent. shown on the two months against the Philosophical Hall as compared with Headingley is almost wiped out. On one of the eight Sundays Leeds enjoyed rather more sunshine than Headingley, and on the other seven Sundays the difference was very trifling. The influence of manufacturing smoke must be the factor here, for domestic smoke is not likely to be less at Headingley on Sundays than on other days. In conclusion, I have the conviction that the practical importance of this subject exceeds that of the older branches of meteorology. The mean rainfall and temperature of any place seem to be less important factors than the mean sunshine. As a consideration for the physician, in selecting the health-resort to which he shall send his patient, or for every man able to choose a residence chiefly because of the salubrity of the position, I feel sure that the inquiry as to sunshine will rapidly become appreciated. The sanitary reformer may appeal to this new witness for evidence of the artificial deterioration of our atmosphere, and it is to be hoped that the result will be favourable to the conservancy of our birthright in sunshine. The methods of the inquiry are now at our disposal, and it is to be desired that the new year may be selected by many new observers for taking part in this interesting investigation.

THE BEVERAGES IN COMMON USE.*

BY PROFESSOR DUJARDIN-BEAUMETZ.

(*Concluded from page* 553.)

The white wines, which contain much less tannin than the preceding, because being made from the black grape they owe their white colour to the fact that they were not kept in prolonged contact with the skins and pulp of the grape, contain, on the other hand, more of the potassic tartrate. They are the diuretic wines *par excellence*, and even Hippocrates noted their action on the kidneys. Certain of these white wines which are a little tart, when diluted with alkaline waters, constitute an agreeable beverage, and possess undisputed diuretic properties.

As for the effervescent wines, of which the type is champagne, they render us important service in medicine. By the carbonic acid they contain, and which is intimately combined with them, they have a marked calmative action on the mucous membrane of the stomach; hence whenever, in cases of irritation of that viscus with vomiting (as in peritonitis), there is indication for an alcoholic stimulant, these sparkling wines serve a good purpose. Here we often find nothing

* A lecture on Hygienic Therapeutics, delivered in Cochin Hospital. From a translation in the *Therapeutic Gazette*.

better than iced champagne, whose effects not seldom are marvellous.

The second class of alcohols consists of the fermented beverages,—cider, perry, and beer: the two former, which are the product of the fermentation of apples and pears, are widely in use in France. Girard, the director of the municipal laboratory of Paris, who has made a careful analysis of cider, has shown that an ordinary sample of this fermented beverage contains 5 to 6 per cent. of alcohol, about 3 per cent. of ash, and watery extract in the proportion of about one ounce per quart. As for the sweet ciders, they contain a much smaller quantity of alcohol, which does not exceed 1·70 per cent.

Apart from the alcohol which enters into its composition, cider contains a large quantity of alkaline salts, phosphates, carbonates, malates, etc.; hence it is that cider is diuretic, and Denis Dumont has highly extolled the usage of this beverage in the treatment of gout and the uric acid diathesis. The considerable proportion of potassic salts which it contains also renders it slightly purgative; and hence it is that cider is much resorted to by some persons for a laxative effect.

Compared with cider and perry, beer, ale, and porter are of much more general usage, and it may be affirmed that in Europe there are more beer-drinkers than wine-drinkers.

Beer, as you know, results from the fermentation of the starch contained in certain grains. During germination the starch of the grain is transformed by the vegetable diastase into grape-sugar, and this natural process is utilized in the fabrication of beer by the fermentation or maltage of barley. To this sweet infusion of malt or wort is added infusion of hops, which communicates its special taste, and the fermentation is effected either under heat or cold.

We find in the fermentation of beer a demonstration of the laws established by Pasteur, that each of these fermentations has its special organic conditions, the high yeast corresponding to the fermentation which takes place at from 15° to 20° C., and the low yeast corresponding to that which takes place at 4° or 5° C. Lastly, an impure kind of malt yeast—the *Saccharomyces Pastorianus* of Ress—produces a bad fermentation of the beer.

These beers, if we may trust Girard's analysis, which I place before you, contain a proportion of alcohol varying from 3 to 7 per cent. The strongest beers, as you well know, are the English.

Beers which contain less than 3 per cent. of alcohol are called small beers, or beers of consumption, and must be drunk as soon as made or they will spoil.

These malt liquors are very diuretic, and this property is largely proportioned to the quantity imbibed. The beer-drinker is not easily satisfied, for beer is a beverage that is not good to quench thirst. The more one drinks of beer the more he wants to drink, and it suffices to go through the breweries of certain countries, as those of Bavaria, to see what enormous quantities a man can drink. Some have been known to exceed twenty quarts a day. Fortunately, however, owing to the diuresis which it excites, a quantity so excessive does little but pass through the economy, transforming the beer-drinker into a veritable filter. This continued stimulation of the kidneys, however, is not unattended with serious evils, and we see renal degenerations follow the forced labour to which these glands are subjected.

CENTESIMAL COMPOSITION OF BEERS.

French Beers.

	Alcohol. Mean.	Extract. Mean.	Ash. Mean.
Strassburg	4·7	4·65	0·32
Lille	4·1	4·65	0·35
Paris	3·5	6·00	0·35
Nancy, Tantonville, etc..	5·6	5·70	0·9
Lyon	5·5	5·00	0·9

German Beers.

	Alcohol. Mean.	Extract. Mean.	Ash. Mean.
Saxony	3·7	5·8	0·25
Bavaria	4·5	7·2	0·29
Hanover, Holstein, Pomerania	4·2	5·9	0·25

Austrian Beers.

Vienna, Moravia	3 5	6·1	0·20
Bohemia	3·6	4·7	0·20

English Beers.

Ale of exportation	7·3	5·9	0·35
London porter	5·2	6·4	0·32

Belgian Beers.

Lambic	6·02	3·7	0·32
Faro	4·15	4·2	0·32
Barley beer	4·35	3·4	0·32
Different beers	5·8	5·5	0·32

By the diastase which they contain these malt beers supply a nutrient which has a digestive action on the carbohydrate alimentary principles; hence vegetarians ought to be beer-drinkers. Certain liquid malt preparations in the markets (Hoff's, Wyeth's, Nicholson's, etc.) are beers rich in diastase and dextrine. Lastly, there are medicinal beers charged with hops, scurvy-grass, horse-radish, pine-buds, Peruvian bark, and called "tonic," "antiscorbutic" beers, preparations very little used, at least in France.

The third group of alcoholic beverages comprises distilled spirits and aromatized liquors. The consumption of these liquors is everywhere on the increase. In some years it has been enormous, and there is no reason as yet to predicate a decreasing ratio. In France the quantity of pure alcohol consumed in 1850 was 585,200 hectolitres; the past year it has been nearly four times that amount, or almost 2,000,000 hectolitres.

All the efforts put forth by the various governments to stay the increase in the use of distilled liquors have thus far failed. Increased taxation of spirits, severe penalties against drunkenness, diminution in the number of grog-shops, none of these things have availed. The temperance societies themselves, notwithstanding the augmentation of their membership, and notwithstanding the rigorous exclusion of every kind of alcoholic beverage, have done but little to retard the progress of intemperance. I am assured, however, that this statement is not strictly true as applied to some parts of the United States.

We see in this almost universal spread of drunkenness one of the saddest facts connected with the age in which we live.

The alcohols due to fermentation constitute a natural chemical series, of which the formulæ go on increasing from ethyl alcohol to amyl alcohol, thus:—

Ethyl alcohol, C_2H_6O; propyl alcohol, C_3H_8O; butyl alcohol, $C_4H_{10}O$; amyl alcohol, $C_5H_{12}O$.

In the work undertaken by Audigé and myself 'On the Toxic Power of the Alcohols,'* we showed that the degree of toxicity of these bodies followed in almost a mathematical ratio their atomic formula, and the following tables which I place before you sum up the results which we obtained in our first experiments which pertained to acute alcoholism (see next page).

These results have been entirely confirmed by another series of researches, which lasted more than three years, and which pertained to chronic alcoholism, the subjects of the experiments being hogs. All these results may be summed up in this one sentence,—*the higher in the series the alcohol, the more toxic it is.*

All the spirits in common use contain variable proportions of the different alcohols of the series; but while

* Dujardin-Beaumetz and Audigé, 'Experimental Researches on the Toxic Power of the Alcohols.' Paris, 1886.

wine spirit possesses but feeble quantities of propyl, butyl, amyl alcohols, as Ordonneau has shown, potato and grain spirit contain these higher alcohols in excess, and they can only be removed by successive rectifications.

Table A.—Degree of Toxicity of the Primordial Alcohols.

Group of alcohols.	Designation of the alcohols and their derivatives.	Medium toxic doses per kilogram of weight.	
		In the pure state.	In the state of dilution.
		Grams.	Grams.
Alcohols of fermentation.	Ethylic alcohol (C_2H_6O).	8 00	7·75
	Propylic alcohol (C_3H_8O).	2·90	3 75
	Butylic alcohol. ($C_4H_{10}O$).	2·00	1 85
	Amylic alcohol ($C_5H_{12}O$).	1·70	1·50
Alcohols not of fermentation.	Chemically pure methyl alcohol (CH_4O).	—	7·00
	Ordinary wood spirit.	—	5·75
	Œnanthylic alcohol ($C_7H_{16}O$).	8	
	Cetylic alcohol ($C_{16}H_{36}O$).	7·50	
Iso-alcohols . .	Iso-propylic alcohol (C_5H_8O).	—	3·70 to 3 80
Poly-atomic alcohols . . .	Glycerin ($C_3H_8O_3$).	—	8·50 to 9·00
Derivatives of alcohols.	Acetic aldehyde (C_2H_4O).	—	1·00 to 2·00
	Acetic ether ($C_2H_3O_2C_2H_5$).	—	4·00
	Acetone (C_3H_6O).	—	5·00

Table B.—Degree of Toxicity of the Alcohols of Commerce.

Ethylic alcohol and the alcohols of commerce.	Medium toxic dose, which, per kilogram of the weight of the dog, will kill within 24 or 36 hours.	
	Crude spirit.	Rectified.
	Grams.	Grams.
Ethylic alcohol (dilute)	7·75	
Fine wine spirit of Montpellier . .	7·50	
Brandy made from perry (by distillation)	7·35	
Cider brandy, and that obtained by distilling the marc of grapes . . .	7·30	
Alcohol obtained from grain . . .	6·95	7·15
Beet spirit	6·90	7·15
Potato spirit (whiskey from distillation of potatoes)	6·85	7·10
Potato whiskey, ten times rectified .	—	7·35

Ordonneau, in an interesting work on the composition of distilled liquors, has brought to light this interesting fact, that the nature of the spirit produced in a fermenting solution depends on the ferment employed. If the ferment is impure, there are generated iso alcohols, while with a pure ferment you obtain true alcohols. Despite the identity of formula which exist between iso-alcohols and the alcohols properly so called, the toxicity of the former is much greater than that of the latter.

Manufacturers of spirits have of late found that certain amylaceous substances, and especially rice and maize, under the action of a pure ferment, such as that high malt yeast which we use in making galazyme, give origin to ethyl alcohol of almost absolute purity, not even needing rectification, so minute are the proportions of the more toxic alcohols (potato, butyl spirit, etc.).

Pure or absolute alcohol is only of interest chemically. Rectified spirit is alcohol with 16 per cent. of water, sp. gr. ·838. Proof spirit consists of an admixture, in nearly equal proportions, of alcohol and water, and the distilled liquors sold for ordinary consumption are intended to be of about this strength.

The following table shows the richness in alcohol of different commercial spirits:—

	Alcohol.	
	By weight.	By measure.
Commercial cognac contains .	—	50 to 54
Rum contains	—	72 to 77
Gin contains	—	50
Whiskey contains.	—	59
Rectified beet spirit contains .	—	94

Since the phylloxera has made such ravages with our vines, France, which, in its vine-growing departments, as Charentes, used to produce the best brandy in the world, has suffered such a falling off in the production of this spirit that one must to-day be a millionaire to be able to afford good brandy for his table; nor are we even sure of obtaining good brandy by paying twenty francs per litre for it.

But the brandy made from wine has been replaced by beet and grain whiskey, to the great detriment of the consumer. In 1875 France produced 348,723 hectolitres of brandy; in 1879 the quantity was only 4929 hectolitres, and 13,073 in 1882. These figures show pitiably when placed by the side of the 2,000,000 hectolitres of alcohol which we consume in France.

By the side of these spirits we must place the "liquors" of the retail shops and "*cafés.*" The quality of these "liquors" depends on the kind of alcohol employed and the substance with which they are aromatized. Unfortunately, the flavouring ingredients introduced generally only serve to disguise the bad taste and bad quality of the alcohol used, and this is what happens in the case of low-priced liquors, and in particular of absinthe. As for the pretended stomachic and aperient substances with which the liquors of our drinking-saloons are "doctored," they have no healthy stimulant effect on the digestion, and all the bitter extracts, gentian, quassia, aloes, absinthe, etc., which, added to the whiskey or rum, constitute the basis of popular "bitters," have no favourable action whatever on the secretion of gastric juice, but rather retard and arrest it, as Tschelzoff, one of Professor Botkin's clinical chiefs, has recently shown.* Those that think that they have derived benefit from them, in all likelihood have confounded the cramps of the stomach, which they may have experienced under the irritant action of these liquors, with the sensation of hunger.

I have finished this long enumeration of alcoholic beverages, and I shall conclude by saying a few words about the physiological action and digestibility of alcohol.

Alcohol is of itself an irritant, and when applied to mucous membranes it develops a sensation of heat and burning, which is the greater the more concentrated the alcohol. When introduced into the stomach, besides the symptoms of irritation, it occasions an exaggeration in the acidity of the gastric juice. The experiments of Charles Richet on Marcellin are very demonstrative of this fact.

In the normal state the acidity of Marcellin's gastric juice was represented by 1·3 gram of hydrochloric acid per litre. During digestion the acidity rose to 1·7 gram; but as soon as an alcoholic stimulant was introduced the acidity went up to 2·7 grams, and even 4 grams per litre.

This is a capital point in the physiology of alcohol as far as its influence on digestion is concerned, and this property is utilized to a certain extent in all countries, and especially in Normandy, where it is a common custom to "make a hole," as they call it, in the middle of a meal by drinking a small glass of brandy. In this way the acidity of the gastric juice is augmented, and the

* Tschelzoff, "On the Influence of Bitters on the Digestion and Assimilation of Albuminoid Matters" (*Centralblatt für die Medicinischen Wissenschaften*, 1886, No. 24).

stomachal digestion is increased. From this fact there arises an important indication,—to give to patients affected with dyspepsia from want of secretion of gastric juice a small glass of liquor after their meals.

But it will not do to prolong this action of the alcohols, for little by little the pepsin-glands become worn out and cease their functions, to give place to the increased secretion of the mucous glands. All our alcoholic dyspeptics go through about the same history. There is, first of all, gastric irritation with pyrosis, resulting from the exaggerated acidity of the gastric juice, then these symptoms give place to gastrorrhœa, characterized by the petuitous vomiting and dyspepsia of drunkards.

Alcohol, when ingested, is absorbed by all parts of the digestive tube, but especially by the intestines. It is taken up by the radicles of the portal vein, and passes into the hepatic circulation, where its presence determines portal periphlebitis, the origin of the cirrhosis of drunkards. Then it enters the general circulation, to be eliminated by the lungs and kidneys, whether in the state of unchanged alcohol or in that of acetic acid and aldehyde.

Many hypotheses have been put forth as to the physiological action of the alcohols. It is one of the most interesting of medico-physiological questions, of which I can only sum up here the leading points.

All these hypotheses may be reduced to two. The first is the theory maintained since 1860 by Lallemand, Duroy, and Perrin, which affirms that alcohol is neither transformed nor destroyed in the organism, and that the total quantity being eliminated unchanged, it cannot be considered a food. The other theory is that supported by my regretted master, Bouchardat, who claims that alcohol undergoes combustion and transformation in the economy, and therefore acts the part of a food. This is the view which I hold, and which I have defended to the best of my ability the past two years before the Academy.

You put together, I have said, in the circulating blood two chemical bodies, the one alcohol, having a strong affinity for oxygen, the other hæmoglobin, ready to yield up its oxygen under the most feeble influence, that of an inert gas, for instance, and you pretend that no exchange takes place between these bodies. Exchanges do take place, and I have demonstrated with my pupil, Jaillet, the transformation *in vitro* of alcohol into acetic acid under the influence of hæmoglobin. I believe then fully in the combustion of a part of the alcohol ingested, and this combustion takes place at the expense of the oxygen of the hæmoglobin of the blood-corpuscles.

This view, moreover, finds confirmation in the experiments of Bandot, Schalinas, Anstie and Lauder Brunton, of Lussana, and Albertoni, all of whom have no doubt as to the combustion of a portion of the alcohol ingested.

So, then, to sum up my view as to the physiological action of alcohol, I should say that when introduced into the economy in non-toxic dose, a certain part of the alcohol is oxidized and is transformed into acetic acid, then into alkaline acetates, then into carbonates. Alcohol is then a food, but a waste-restraining food, which, instead of energizing the combustions, slows them by robbing the blood-corpuscles of a certain quantity of oxygen. It is this action on the blood-corpuscles which explains to us the antithermic power of the alcohols, an action which attains its maximum of intensity when toxic doses of alcohol are administered. In such toxic cases the alcohol is no longer burned, but destroys the globules and dissolves the oxyhæmoglobin. Ordinarily not all the oxygen ingested undergoes combustion. A part unchanged acts directly on the cerebro-spinal axis, and there determines phenomena of intoxication, of sleep, and of vaso-motor modifications, varying according to the quantity of alcohol ingested.

These three properties—alimentary, antithermic, and tonic—have made alcohol one of the most powerful agents of the antithermic treatment of disease, and I shall not here take your time in enumerating the numerous applications of alcoholic stimulants to medicine. I cannot do better than refer you for a vigorous handling of this whole subject to the thesis of fellowship of my former pupil, Professor Grancher, 'On the Tonic Medication,' a thesis published in 1875. This finishes what I have to say about an agent which has a prominent place in hygienic therapeutics.

All the beverages considered in this lecture are taken at meal-time or between meals (the principal consumption is at meal-time), and the greater or less abundance ingested has a decided influence on the volume of the digestive tube. Dancel, basing himself on the fact that in veterinary practice one may augment or diminish at pleasure the dimensions of the horse's stomach by augmenting or diminishing the quantity of water which the animal is allowed to drink, has also shown that it is the same with man; hence he would limit to half a pint the quantity of liquid which a corpulent person ought to take with his meal. Schweninger has gone further, and has suppressed all drinks from the dietary of obese patients, and he recommends that such persons shall not drink till two hours after meals. In the next lecture, when I come to the treatment of obesity, I shall take up this point again.

This abstinence from liquids, which has been described under the name of *the dry diet cure*, and which Fonssagrives calls *xerophagia*, has been also applied to the treatment of dilatation of the stomach. Hippocrates, Petronius, Asclepiades, and Müller had always pointed out the advantages of a dry diet in the case of serous effusions, and when there was an indication to dry up certain exaggerated secretions. This regimen has been revived in our time by Chomel in the treatment of what he improperly calls *the dyspepsia of liquids*, and by Huchard in combating dilatation of the stomach. In cases of gastrectasia, in fact, the allowance of liquids ingested augments the stomachal dilatation; hence there is every reason for restricting the quantity of drinks.

EDIBLE FUNGI.

In the Students' Society for Natural Sciences at Upsala, Herr C. T. Mörner has contributed a careful analysis of the following edible fungi, viz.:—*Agaricus campestris*, *Lycoperdon Bovista*, *A. procerus*, *Morchella esculenta*, *Boletus edulis*, *B. scaber*, *Lactarius deliciosus*, *Hydnum repandum*, *L. torminosus*, *H. imbricatum*, *Cantharellus cibarius*, *B. luteus*, *Sparassis crispa*, and *Polyporus ovinus*. The above order represents the relative proportion of *digestible* albuminoids, varying from 22·3 per cent. of the dried substance in the first, to 3·1 per cent. in the last. But, in addition to this, there is a large quantity of *indigestible* albuminoids, amounting to as much as 16·7 per cent. in *Lycoperdon Bovista*, and 11·8 per cent. in *Morchella esculenta*, and in many cases exceeding the amount of digestible nitrogenous constituents. Other nitrogenous constituents not of an albuminoid character—ammonium salts, amido-acids etc.—are also invariably present, though usually in smaller quantities, the nitrogen in them representing from 0·21 to 2·49 per cent. of the total dry weight of the fungus. The total result of these investigations is materially to reduce below the amount hitherto supposed the proportion of digestible constituents in edible fungi, and consequently their value as articles of food.

The writer further states that a hen's egg corresponds, in nutritive value, to 0·28 kgr. of *Agaricus campestris*, 0·73 of *Lactarius deliciosus*, 1·30 of *Cantharellus cibarius*, and 2·05 kgr. of *Polyporus ovinus*; 1 kgr. of beef contains as much nutriment as 9·3 kgr. of *Agaricus campestris*, 15·2 of *Morchella esculenta*, 24·2 of *Lactarius deliciosus*, 41·6 of *Cantharellus cibarius*, and 67·0 of *Polyporus ovinus*. The daily requirements of the body in digestible albuminoids (130 gr.) would be furnished by 5·7 kgr. of *Agaricus campestris*, 6·9 of *A. procerus*, 9·9 of *Boletus edulis*, 14·7 of *Lactarius deliciosus*, 26·3 of *Cantharellus cibarius*, and 41·6 of *Polyporus ovinus*.

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COW'S MILK FOR INFANTS.

AN extremely interesting paper was published last April in the *Medicinische Wochenschrift*, of Munich, upon the nutrition of infants with cow's milk. The subject had been previously brought before the Medical Society in Munich by Professor SOXHLET, who, taking his stand upon LISTER'S observations, held that so long as the milk of the cow remains in the udder it continues to be free from the organisms which determine the ready decomposition of milk after it has been drawn from the cow. Reasoning by analogy, and bearing in mind the conditions of the direct supply of pure milk from the breast to the stomach of a child, as compared with the manner in which cow's milk is obtained in the first instance from the cow, then how it is brought to market, and the treatment it meets with in the kitchen or the nursery, it will be obvious that there are several essential differences between the natural and the artificial feeding of infants. In the former case the child is supplied with milk free from germs; in the latter case with milk which is comparatively charged with ferments, and sometimes is even in a state of decomposition. Although the material differences between human milk and cow's milk consist chiefly in the smaller amount of casein in human milk and some other relations between the salts and the character of the albuminoid constituents that are not yet cleared up, there is still ample room for the inquiry as to the reason for the superiority of natural feeding to the artificial. This is the question which Professor SOXHLET has undertaken to investigate, and he has commenced to answer it by asking the further question whether human milk would bear so favourable a contrast to cow's milk if it were subjected to the same conditions of infection as cow's milk when brought into the market and given to a child out of a bottle. As a striking illustration of the difference between natural and artificial feeding he instances the fact that calves fed out of pails are during the first weeks frequently subject to diarrhœa, and that there is no better remedy for this complaint than to let the calves suck the cow. It is this aspect of the subject to which Professor SOXHLET especially directs attention as indicating precisely the point which constitutes the difference between natural and artificial feeding. According to him it is not so much a matter of importance what food is given to an infant as how that food is given and how far contaminated with ferments. In regard to the fodder of the cow, he dismisses the common idea that dry fodder only is proper for cows that are to supply milk for infants, and he regards as equally ill-founded the notion that infants are affected by anything out of the way given to the cows furnishing their milk. But however the influence of feeding is exercised, the net result is chiefly an increase in the quantity of milk and an alteration in the amount of water without any great relative change in the proportion of any one constituent. Careful experiments that have been made by Professor SOXHLET, have, moreover, shown that the tendency of milk to decompose is not dependent upon the nature of the fodder given to the cows; but at the same time it was found that in stalls where fermenting and decomposing fodder were used for the cows there is much greater opportunity for infecting the milk than when dry fodder is used, and it is upon this ground that the use of fermenting grains or such material would be undesirable for feeding cows that were to produce milk for infants. In the course of the experiments on this point it was found that when carefully collected, even in stalls that were not very clean, milk would keep from 40 to 60 hours without curdling, and even still longer when kept cool. Hence the conclusion come to was that the common experience that milk does not under ordinary conditions keep more than 24 hours without turning sour is due to the introduction of germs and ferments in various ways.

In offering a definite suggestion in order to overcome the inconveniences that have hitherto attended the artificial feeding of infants, Professor SOXHLET lays down the fundamental principle that the superiority of natural feeding consists essentially in the fact that it ensures the supply of milk free from germs, while, on the contrary, in feeding an infant with cow's milk the influence of the presence of ferments and injurious organisms is exercised, and the milk is thus frequently in a condition of incipient decomposition. By destroying or sufficiently attenuating these organisms the dissimilarity of natural and artificial feeding will be to a great extent, if not entirely, done away with. Since the complete sterilization of milk would be difficult, it is desirable, for the practical adaptability of any method for this purpose, to be content with carrying the destruction of the lactic ferment, which is well known to possess considerable power of resistance, to such an extent that milk can be kept at the average atmospheric temperature for three or four weeks without turning sour. Sterilization to this degree may be effected when the milk is heated in closed flasks for the space of 35 to 40 minutes to the

temperature of boiling water. In order to conform to the conditions of natural feeding, each single portion of milk intended for a meal is to be treated in this way to protect it from infection. This method of treatment has lately been systematically carried out by Professor SOXHLET and practically applied in his own family without involving any difficulty. Though, as he says, the single case does not prove much, he points out that although the supply of milk for the child was obtained from a tolerably unclean cow stall in the town, where distillery refuse and very sour beer grains were used, as well as hay, for feeding the cows, there was not a single occasion on which the child experienced the least disturbance of the digestive organs, whether the milk were mixed with water alone or with a 10 per cent. solution of milk-sugar, cane-sugar, grape-sugar, or malt extract and lime-water. The arrangements for sterilizing milk in this way are very simple, consisting of a series of ten bottles like soda-water bottles of about six fluid ounces capacity and capable of being exposed to heat without cracking. These are fitted into an open stand like a cruet-frame, and when filled with milk are placed altogether in a metal pot of water for heating. The mouths of the bottles are furnished with caoutchouc corks, through each of which passes a small piece of glass rod for closing the aperture. Each bottle has also the usual feeding-bottle fitting made of vulcanized tube. With brushes and other provisions for cleaning the bottles and tubes the whole apparatus is complete. The directions given for preparing milk are first to operate upon it as soon as possible after it has been taken from the cow, and then after diluting it or making any desired additions, to fill as many of the bottles as will suffice for one day's supply or rather more, leaving room for a small vacant space at the neck after the cork is forced in. The bottles are then placed in the stand, and immersed in the pan of water so as to be covered up to the neck. Heat is then applied until the water boils, and when the milk and air in the bottles have expanded sufficiently, the glass rods are forced into the holes in these corks so as to close the bottles completely. The water is then kept boiling rapidly for about 35 or 40 minutes, and the stand with the bottles in it is then lifted out to cool. Milk that has been treated in this way will keep at the ordinary temperature of a room from three to four weeks without curdling, and when in a cool place from four to five weeks. At the same time it is free from the inconvenient formation of skin on the surface, by which the feeding tubes become stopped up and made dirty. It is advisable to keep milk prepared in this way as cool as possible, and when a bottle is required for use it should be placed in a small pot of warm water until it has the requisite temperature of the body. Until this is the case the bottle should not be opened, and then the cork is to be rapidly removed and replaced by the feeding tube. Any portion of the contents of a bottle that is not consumed at once should not be used afterwards. The most scrupulous care must also be taken in the cleaning of the bottles, corks, tubes and everything belonging to the apparatus.

At a meeting of the Pharmaceutical Society of St. Petersburg last November, Dr. MARTENSON brought forward the subject of milk conservation, and in referring to the benefits that had resulted from the establishment of an official control of the milk supply upon scientific principles, he expressed the opinion that the comparatively small chemical differences of composition between human milk and the milk of cows were probably not sufficient to account alone for the differences observed in feeding infants with these two kinds of milk. At least the observations of Dr. BIEL in reference to the albuminoid material of kumys and kefir did not appear to him to admit of the idea that there was any specific difference between the casein of human milk and that of cow's milk. Having from this view of the subject had his attention drawn to Professor SOXHLET's paper, experiments were very soon after its appearance carried out at the Child's Hospital of Prince OLDENBURG to try the efficacy of sterilization. The results have been so successful that it is now the constant practice to keep two sets of apparatus at work. According to the observations of Dr. D. MEYER, the chief physician of the therapeutical department of the hospital, the sterilized milk was found to have the effect of rendering the evacuations perfectly normal even in cases where intestinal catarrh was in an advanced stage. Dr. MARTENSON also confirmed the statement that milk could be kept quite fresh and good for upwards of three months at the ordinary temperature of a sitting room after having been sterilized as Dr. SOXHLET directs. With the exception of a slight taste of caoutchouc derived from the stopper, he found that milk which had been kept in this way was indistinguishable from good fresh milk.

THE SALE AND DISPENSING OF POISONS BY COMPANIES.

THE opinion expressed by the jury in reference to the case of poisoning at Cheltenham cannot be looked upon as conveying a harsh or unreasonable view of the circumstances, and while it admitted of a merciful verdict being given, it ought to have the effect of calling serious attention to the gross violation of the spirit of the Pharmacy Act, by means of which the Legislature sought to provide for the safety of the public in the dispensing of medicine. If the safeguards by which the ordinary exercise of a pharmacist's business is surrounded, in the interests of the public, are not to be extended in their application to those exceptionally privileged bodies, who are held not to be liable to the law affecting individuals, this obvious anomaly ought at least to be accompanied by their

employment of a properly qualified person to carry out the work of dispensing medicines. It was mainly on this ground that in the final judgment given on the Appeal to the House of Lords in the case of the London and Provincial Supply Association it was held from the point of view of regard for the public safety to meet the requirements of the case if the persons actually concerned in conducting the business were qualified. Indeed, the Lord Chancellor then remarked that if this were not the case he thought the argument would have been extremely strong against a corporation being permitted to carry on the business of a chemist and druggist. Lord BLACKBURN, in like manner, said that he held distinctly there could be no sale, whether a corporation be the ultimate vendor or not, unless a person, a natural person, manages the sale, and that person, if unqualified, would, in his mind, clearly become liable to the penalty under the Pharmacy Act.

It is well to recall to mind those expressions of opinion, after the lapse of some years, for the purpose of showing that notwithstanding the decision of the judges to regard the case of corporations as lying outside the purview of the existing law as it was framed, there was a very strong leaning to that common sense view of the question which at an earlier stage of the litigation had made such a deep impression upon the mind of Lord Chief Justice COCKBURN. It is not inappropriate to do so now that the sale of dangerous, if not poisonous, medicinal preparations is being carried out with such frequency as has been from time to time illustrated in our columns, and of which there is another instance this week.

Next Wednesday, the 19th inst., the Chemists' Annual Ball will be held as usual at Willis's Rooms. This will be the twenty-first occasion on which there has been a repetition of this popular reunion, and although various associations have now grown up that may possess more of the advantage of youthful influences in their direction, the Chemists' Ball has always been such a decided success hitherto that it may be anticipated in this year of its majority it will outshine previous experience. That such will be the case is probable from the fact that the Committee still comprises the names of several members who have long been indefatigable in their endeavours on behalf of the Chemists' Ball, and that its labours have lately been reinforced by the accession of Mr. J. W. Bowen as the Honorary Secretary.

* * *

By a recent modification of the New York State Penal Law it has been made a misdemeanour to sell, give or dispose of any poison or poisonous substance (except upon a prescription), unless a label be attached bearing the name and address of the person supplying it and the word "poison" in plain characters; or to sell, give, dispose of, or offer for sale, any "sulphate or other preparation of opium or morphine" (*sic*), except "paregoric and those preparations containing two grains or less of opium or morphine to the ounce," unless there be attached a scarlet label bearing in plain white letters the name of the article and the name and address of the person supplying it.

* * *

In the December number of the *Pharmaceutische Zeitschrift für Russland*, Mr. Theodor Waage gives a method of preparing quinine pills which is well deserving of notice. Quinine hydrochlorate is mixed with hydrochloric acid in the proportion of about six drops to five grams of the salt. The acid is to be added very cautiously drop by drop, and incorporated with the quinine salt. One drop too much would make the pill mass smeary, but when properly prepared, it admits of being worked very easily. The advantages of the pills made in this way are, that, in the first place, they are so small that they can be swallowed with ease, even when containing as much as 0·25 gram, nearly 4 grains of quinine salt, being only one half the size of pills made with mucilage. Moreover, the pills have an elegant brilliant white appearance that renders them agreeable to patients. They soon become hard without losing their ready solubility, and as they do not become soft by exposure to moist air, they are very suitable for the supply of travellers in tropical countries.

* * *

A curious effect of iodoform upon silver is reported by Dr. Poncet, who had his attention directed to it by a patient, to whom he had been applying iodoform dressings, telling him that all soups and other diet for which she used a silver spoon had a very disagreeable taste and that the spoon itself had a garlicky odour. Upon investigating the subject Dr. Poncet found that silver that has been in contact with iodoform, or which is even touched by the fingers after they have been in contact with iodoform, acquires a nauseous odour, resembling that of garlic, which becomes more perceptible upon rubbing the silver. A drop of saliva from a patient fully under the influence of iodoform is said to be sufficient to impart this odour to silver, or the mere exposure of iodoform and silver in the neighbourhood of one another. The odour is not that of iodoform, but is thought to be due to a decomposition product.

* * *

It is announced that Professor Armstrong is about to commence a course of twenty lectures on the "Chemistry of Nitrogen and its Compounds, with Special Reference to the Recent Investigations of the Alkaloids, Albumenoids, etc.," which will be delivered at the Central Institution of the City and Guilds of London Institute, Exhibition Road, on succeeding Mondays and Wednesdays at 5 p.m. The fee for the course will be one guinea.

* * *

A meeting of the Liverpool Chemists' Association will be held on Thursday evening next, January 20, when a paper on "Salol, its Uses in Pharmacy and as an Antiseptic," by Mr. Norman Tate, will be read.

* * *

The next meeting of the School of Pharmacy Students' Association will take place on Thursday, January 20, when Mr. E. White will read a note on "Commercial Jalapin and Jalap Resin," and Mr. L. W. Hawkins will make a Report on Inorganic Chemistry.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

A meeting of members and associates in business, resident in Scotland, was held in the Society's House, 36, York Place, Edinburgh, on Wednesday, January 12, at 12 noon.

On the motion of Mr. Nesbit, seconded by Mr. Baildon, the chair was taken by Mr. James Mackenzie, Edinburgh.

A letter of apology was received from Mr. Daniel Frazer, Glasgow.

The minutes of last meeting were read and approved.

The Chairman then called upon the Assistant-Secretary to read the report of the Committee appointed at the meeting held on November 24.

Report.

"The Committee appointed to carry out the decision arrived at by the meeting held on November 24 last have now to submit the following report:—

"A meeting of the Committee was held at 36, York Place, Edinburgh, on Wednesday, December 8, and arrangements were then made for the issue of nomination and voting papers for the election of the Executive of the North British Branch. It was remitted to Messrs. Baildon and Mackenzie to superintend the carrying out of details.

"On December 10, 292 nomination papers were issued, and on December 28 Messrs. Baildon and Mackenzie examined the nomination papers returned and the replies received from those nominated. It was found that 56 members and associates in business had been nominated, of whom the following 29 were willing to act if elected:—

1. Ainslie, William, 58, George Street, Edinburgh.
2. Boa, Peter, 119, George Street, Edinburgh.
3. Clark, William Inglis, 104, South Canongate, Edinburgh.
4. Coates, Edwin, 21, Duke Street, Edinburgh.
5. Duncan, William, 13, East Princes Street, Rothesay.
6. Fairgrieve, Thomas, 46, Clerk Street, Edinburgh.
7. Fisher, John Hutchison, 66, High Street, Dunfermline.
8. Fraser, Jonathan Innes, 13, Dundas Street, Edinburgh.
9. Frazer, Daniel, 127, Buchanan Street, Glasgow.
10. Gibson, Adam, Leven, Fife.
11. Gilmour, William, 11, Elm Row, Edinburgh.
12. Hendry, Robert Love, 27A, Earl Grey Street, Edinburgh.
13. Henry, Claude Francis, 1, Brandon Terrace, Edinburgh.
14. Hardie, James Miller, 68, High Street, Dundee.
15. Kermath, William Ramsay, 78, Market Street, St. Andrews.
16. Kinninmont, Alexander, 69, South Portland Street. Glasgow.
17. Laird, George Hardie, 40, Queensferry Street, Edinburgh.
18. Maben, Thomas, 5, Oliver Place, Hawick.
19. Mackay, George Duncan, Canning Street, Edinburgh.
20. Mackenzie, James, 45, Forrest Road, Edinburgh.
21. Nesbit, John, 162, High Street, Portobello.
22. Noble,, Alexander, 139, Princes Street, Edinburgh.
23. Paterson, James, 133, Gallowgate, Aberdeen.
24. Pinkerton, William, 17, Greenside Place, Edinburgh.
25. Robertson, William, 94, High Street, Elgin.
26. Storie, Robert, 94, High Street, Dalkeith.
27. Storrar, David, 228, High Street, Kirkcaldy.
28. Strachan, Alexander, 138, Rosemount Place, Aberdeen.
29. Watt, James, Sen., High Street, Haddington.

"A voting list was accordingly drawn up, and on December 29 292 voting papers were issued.

"The Committee again met to-day at 10.45 a.m., and proceeded to examine the voting papers. The result was found to be as follows:—

Voting papers issued	292
„ „ returned	143
„ „ informal	3

leaving 140 papers to be recorded.

"The following gentlemen have a majority of votes:—

1. Ainslie, William, 58, George Street, Edinburgh.
2. Boa, Peter, 119, George Street, Edinburgh.
3. Clark, William Inglis, 104, South Canongate, Edinburgh.
4. Frazer, Daniel, 127, Buchanan Street, Glasgow.
5. Gibson, Adam, Leven, Fife.
6. Gilmour, William, 11, Elm Row, Edinburgh.
7. Hardie, James Miller, 68, High Street, Dundee.
8. Kermath, William Ramsay, 78, Market Street, St. Andrews.
9. Kinninmont, Alexander, 69, South Portland Street, Glasgow.
10. Maben, Thomas, 5, Oliver Place, Hawick.
11. Mackay, George Duncan, Canning Street, Edinburgh.
12. Mackenzie, James, 45, Forrest Road, Edinburgh.
13. Nesbit, John, 162, High Street, Portobello.
14. Noble, Alexander, 139, Princes Street, Edinburgh.
15. Storrar, David, 228, High Street, Kirkcaldy.
16. Strachan, Alexander, 138, Rosemount Place, Aberdeen.
17. Watt, James, Sen., High Street, Haddington.

"The voting papers and all other documents connected with the election are submitted herewith.

"Signed in name of Committee,

"James Mackenzie,

"*Convener.*"

It was moved by Mr. Kinninmont, Glasgow, seconded by Mr. Ainslie, and unanimously resolved:—

"That the report of the Committee be adopted."

Mr. Mackenzie then stated that it would have been observed that the Council had decided not to make any alteration on the resolutions adopted at the Council meeting on November 3. He thought it right to mention that he had received a courteous intimation to that effect.

The meeting was then closed.

The above gentlemen, together with the President of the Society (Michael Carteighe), the Vice-President of the Society (Thomas Preston Gosgling), Henry Bellyse Baildon, of Edinburgh, and John Borland, of Kilmarnock, as *ex officio* members, will therefore form the Executive.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on the 5th instant, at the Society's rooms, No. 11, Harcourt Street, Dublin, at three o'clock.

The President (Mr. William N. Allen) in the chair.

The other members present were, the Vice-President (Mr. Draper), Dr. Evans, Mr. Ray, Dr. Collins, Mr. Beggs, Mr. Hodgson, Mr. Simpson, Mr. Brunker, Dr. Montgomery, Mr. Wells, and Professor Tichborne.

Mr. Ferrall, the Registrar, read the minutes of the last meeting, which were signed.

The President said that before the business for the day commenced, he wished to mention that he had received from Dr. Tweedy his recommendations in reference to the Preliminary examinations. That day a communica-

tion had been received from the Privy Council, stating that in future the reports of Dr. Duffey, the Visitor of the Examinations, would be made annually, and also approving of the new rules of the examiners. These matters would not come before the Council until the next meeting; but he thought it well that members should know the facts that he had mentioned.

The Vice-President: So that the wish of Dr. Duffey to make annual reports has been acceded to rather than the wish of the Council that they should be made quarterly.

A letter was received from Mr. Joseph Edmondson, stating that he believed a great many members of the Society preferred the *Chemist and Druggist* to the *Pharmaceutical Journal*, and asking that the Council should take steps to ascertain which journal the majority of the members preferred. The writer mentioned that the Society would save by adopting the *Chemist and Druggist* as their organ. Another letter from Mr. Edmondson, of a previous date, requested that the *Pharmaceutical Journal* should no longer be sent to him, as it was not his intention to renew his subscription to the Society.

The President: The second letter shows the animus of the gentleman. He is not going to renew his subscription, and therefore, I think, is scarcely qualified to give an opinion as to what journal ought to be supplied to the members.

Dr. Evans: I thought this matter was decided long ago.

The Vice-President: I move that Mr. Edmondson's letter be marked "read."

Mr. Hodgson seconded the motion. From the first he had been opposed to giving these periodicals to the members, because it looked like a bribe to them to join the Society. Those who wanted them should be left to get them for themselves, and it should not be necessary to be a member of the Society in order to get any periodical. He was overruled, however, and a proposition was made to the proprietors of the *Pharmaceutical Journal*, who responded to it in a most liberal manner, and made a very substantial reduction in the charge for their periodical. Under such circumstances it would be very ungracious for the Society to withdraw from the arrangement. At the same time his opinion about the arrangement had never changed, and he still thought that the £20 a year was thrown away.

The Vice-President said they should not forget that in the case of the English Pharmaceutical Society the privilege of membership was accompanied with a copy of the Journal. That Journal reported their proceedings; and other things being the same, it seemed reasonable that that Society also should give its members copies of the Journal. He was not sure, however, that their worthy Treasurer was not half right; and if he were sure that the withdrawal of the Journal would not diminish the number of the Society's members, he would be entirely with him.

Mr. Hodgson: Things are not equal. The Pharmaceutical Society of Great Britain has a large income and we have not.

The motion that the letter be marked "read" was unanimously passed.

A letter was read from the Agent-General of South Australia, stating that anybody could there act as a chemist without any previous examination whatever.

The President: That letter may be marked "read." The information will be inserted in the Calendar.

A letter was read from the Secretary of the High Commissioner for Canada, stating that he would at any time supply to licentiates of the Society, who wished to emigrate to that country, any information in his power.

The President: He can give no information. The law as to the status of licentiates from this country is different in different parts of the Dominion.

The letter was ordered to be entered on the minutes.

A letter from Colonel Caulfield stated that he had been directed by Sir Michael Hicks-Beach, Chief Secretary for Ireland, to acknowledge the receipt of the letter of the Registrar of the Society requesting an interview for a deputation, as suggested by the President of the Council, and asking for information as to the nature of the matters it was desired to bring under the Chief Secretary's notice. Another letter from Colonel Caulfield, dated December 14, stated that as to the request that the Chief Secretary should receive a deputation from the Society on the subject of the suggested amendments in the Sale of Poisons (Ireland) Act, 1870, and the Pharmacy Act, 1875, the writer had been directed to say that owing to the pressure of most important affairs Sir Michael Hicks-Beach was unable to deal with the subject, especially as it would appear that any necessary changes in the law could be proposed in Parliament by a private member.

The President: The present state of Ireland, you see, affects pharmacy; we cannot get any attention paid to us. I do not know whether it would be an advisable thing to look up any private member.

Dr. Evans asked that the letter written in reply to Sir Michael Hicks-Beach's first communication, asking the nature of the matters that it was desired to bring under his notice, should be read.

Mr. Ferrall read the letter, which was dated December 11, 1886, and which stated that the amendments now required by the Council were the same as those which were suggested by their deputation, which had an interview with Mr. Trevelyan in 1884.

The letters were entered on the minutes,

A letter was received from Mr. Harry Carter Draper, containing suggestions respecting a new chemical bench, a model of which was placed on the table. The bench proposed would be ten feet long, by four feet six inches broad, and three feet high. It would not cost more than one of the existing benches, while it would do three times as much work. It would be divided by glass partitions into six compartments.

Dr. Evans asked why it was thought necessary to get this bench.

The Vice-President said the Examinations Committee had recommended that all the candidates should be in the room for examination at the same time. In order to carry out that the additional accommodation afforded by this bench was absolutely necessary.

Mr. Brunker suggested that the letter and model should be referred to the Committee.

The Vice-President mentioned that the existing benches would be retained.

Mr. Brunker moved that the letter of Mr. Draper and the model be referred to the Examinations Improvement Committee for consideration.

The Vice-President seconded the motion, which was agreed to.

A report was received from the Certificates Committee and adopted.

Professor Tichborne moved that Mr. George Dimond, of Maryborough, be admitted a member of the Society.

Mr. Simpson seconded the motion and it was unanimously agreed to.

A report of the Law Committee was received and action taken thereon.

Financial business having been disposed of, the Council adjourned.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fifth general meeting of the thirty-eighth session was held at the Royal Institution, on Thursday evening, January 6. The President, Mr. A. C. Abraham, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations announced:—

The *Pharmaceutical Journal*, from the Society; the *Canadian Pharmaceutical Journal*, from the Editor; the *Pharmaceutical Record of New York*, from the publishers; the *British and Colonial Druggist*, from the publishers; 'Drugs and Medicines of North America' vol. ii., No. 2, from Mr. A. H. Mason, Montreal, and the *Journal of the Liverpool Polytechnic Society*, from the Society.

Mr. Harold Wyatt, Jun, Derby Road, Bootle, was elected a member.

There being no miscellaneous communications, the President called upon Mr. E. Davies, F.C.S, F.I.C., to read his paper on "Saccharine" with remarks on "Organic Chemistry Nomenclature."

Mr. Davies in a very interesting paper, described the various steps in the manufacture of saccharine from toluene, a hydrocarbon of the benzene series obtained from coal tar. He stated that it is first converted, by treating with sulphuric acid, into toluene sulphonic acid, and this when treated with phosphorus pentachloride, yields a chloro-derivative, which is now converted into an amido-derivative, and, finally, by oxidation into benzoyl-sulphonic-imide, or saccharine. In his remarks on "Organic Chemistry Nomenclature," Mr. Davies explained very clearly, with the aid of diagrams, the meanings of the terms, ortho-, para- and meta- as applied to the di-derivatives of benzene.

At the close, a discussion took place, and a vote of thanks, proposed by Mr. A. C. Abraham and seconded by Mr. A. H. Samuel, was heartily accorded to Mr. Davies, and the meeting then terminated.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

A special general meeting of the above Society was held at the Lecture Room, Norfolk Row, on Wednesday evening, January 12. The meeting was called "to consider the recent ruling at Sheffield Town Hall, under the Sale of Food and Drugs Act.' The chair was occupied by the President (Mr. Newsholme), and there was a large attendance, the room being almost filled.

The President proposed the first resolution :—

"That this meeting—specially convened—views with alarm the recent deci ion of the Sheffield Stipendiary Magistrate 'that a preparation containing any opium and any alcohol whatever may be legally sold as tincture of opium.' And this meeting is of opinion that if this be upheld as legal and is acted upon, it is likely to dangerously interfere with uniformity and with the public safety. It would further affirm that the only tincture of opium acknowledged generally by the trade is that of the British Pharmacopœia."

The motion was seconded by Mr. Cubley, and carried unanimously.

Mr. Ward, F.C.S., proposed—

"That this meeting expresses also its astonishment at the judgment recently given with respect to paregoric, 'that any preparation of a sooothing nature may be sold under that name.' It holds that the fact of two or more dissimilar preparations having the same name is so dangerous to public health that it is desirable the Pharmacopœia Committee should adopt as a synonym of the compound tincture of camphor of the British Pharmacopœia that which is commonly known as paregoric, paregoric elixir, and elixir paregoric."

This was seconded by Mr. Appleton, and carried unanimously.

Mr. Preston proposed the third resolution, which was as follows :—

"That this meeting desires to point out its determination strictly to conform to the British Pharmacopœia as binding upon it, in accordance with the order in Her Majesty's Privy Council made respecting thereto."

This was seconded by Mr. Ellinor, and carried almost unanimously.

Mr. Furness proposed, Mr. Jervis seconded, and it was unanimously carried—

"That the resolutions be transmitted to the local papers, the *Pharmaceutical Journal*, the *Lancet*, and other trade or professional journals and interested bodies, as the Council may advise."

Mr. Cubley proposed, Mr. Appleton seconded, and it was unanimously carried—

"That the attention of the Council of the Pharmaceutical Society of Great Britain be called to the recent Sheffield magisterial decision. Also to section 15 of the Pharmacy Act, and requiring the Council's action under such section."

A vote of thanks to the Chairman concluded the meeting.

Proceedings of Societies in London.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, January 6, Mr. E. G. Baker, Vice-President, in the chair.

The following paper, by Miss E. A. Munro, who was unable to be present, was read by the Secretary:—

NITRIFICATION.

BY MISS EMILY A. MUNRO.

The subject of nitrification is one of considerable importance and interest, and one which has from time to time been made the subject of a great deal of experimental investigation.

Having during this summer assisted Dr. Munro in carrying out some experiments connected with his researches in this direction, I thought I might bring the results before the members of this Association, and perhaps some might feel an interest sufficient to continue the investigation.

In order to understand the experiments which I shall presently describe, it will be necessary to explain what is meant by the term "nitrification," and to revert to the work which has already been accomplished.

When any organic matter containing nitrogen (such for instance as farm-yard manure) undergoes the process of decomposition, ammonia is formed; this ammonia is readily absorbed by the soil, is there gradually oxidized, and in the presence of salifiable bases supplied by the soil converted into nitrites and nitrates, the oxygen necessary for the reaction being obtained from the air.

The following equation explains the result of the change that takes place:—

$$2NH_3 + O_8 + CaO = Ca(NO_3)_2 + 3H_2O.$$

This conversion of the ammonia into nitrites and nitrates is called "nitrification."

Now when we remember that nitrates form a necessary food of all plants; also that river, well and spring waters liable to contamination by sewage, or decaying vegetable matter, are gradually, but surely, purified by nitrification of the poisonous elements; and lastly that the presence of nitrates in waters, in large or small quantity, is a well-known and valuable indication to the analyst of their purity or impurity, the importance of ascertaining the exact conditions of nitrification, how it is effected, and the circumstances which are favourable or otherwise to it will be at once recognized.

Until recently it was supposed that mere contact of the decomposing organic matter with the oxygen of the atmosphere in presence of a base was sufficient to oxidize the ammonia, but the researches of Messrs. Schloesing and Muntz, in the first instance, and afterwards of Mr. Warington, appear to prove beyond a doubt that nitrification is due to the presence of a microscopic bacterium or ferment, abounding in the soil.

The results of the experiments which support this new theory are—

Firstly—That nitrification will only take place at a temperature suitable to the life and development of living organisms.

Secondly—That chloroform or other poison being intro-

duced into a solution capable of nitrification, prevents the process.

Thirdly—That the presence of nutriment suitable to the lower organisms is an absolute necessity. Thus phosphoric acid is an essential to all life, but Mr. Warington in two of his experiments purposely omitted the addition of a phosphate to the ordinary nitrifying solution, while to a third it was added; the two solutions without a phosphate did not nitrify at all, but the one containing the phosphate nitrified in a month.

Fourthly—Nitrification is effectually prevented by heating solutions containing the seed to boiling point.

Lastly—A mere trace of seed (that is, soil or solution containing nitrifying power) will set up the process in a previously sterilized solution. Dr. Munro records an instance of this kind, where a sterilized solution was actually contaminated by introducing into it a pipette which had simply been washed with distilled, instead of boiling water, after having used it in a solution in full process of nitrification.

Messrs. Schloesing and Muntz have succeeded in isolating the organism producing nitrification, by systematic culture in a fluid medium.

It appears to be a micrococcus, and they have given it the name of *Micrococcus nitrificans*.

Mr. Warington, by a number of carefully conducted experiments with soil, taken from depths of two or three inches from the surface of the ground, to eight or nine feet below, has proved almost conclusively that this organism does not exist much below the surface; nitrification not taking place in solutions seeded with soil from a depth of two or three feet and in many instances not below fifteen inches.

Bearing in mind the foregoing facts, it will be seen that there is almost overwhelming evidence in support of the "ferment theory," and the investigations which are at present being carried on aim more to arrive at an exact knowledge of the conditions which favour or retard nitrification and also to demonstrate the nitrifying process of various natural waters.

Previous to the year 1883 all experiments were made through the medium of artificial solutions, that is solutions generally made up on the following plan:—Distilled water, to which was added ammonia in the form of ammonium chloride, a base, such as carbonate of lime, and organic matter in the form of an alkaline tartrate, together with a little alkaline phosphate and magnesia.

The solutions were sterilized by boiling before the addition of the seed, which consisted of a little arable soil, or a few drops of a nitrifying solution.

In November, 1883, however, Dr. Munro commenced a series of experiments with natural waters.

Now it is well known that the ammonia in polluted well or river water is after a time converted first into nitrites, and finally into nitrates, and his object was to find out whether waters oxidize NH_3 through contact with the air (according to the old theory); or because of their proximity to the soil containing the ferment; or because they themselves are impregnated with the organisms obtained from the soil.

The experiments were made by adding ammonium chloride in known quantities to waters under various conditions, and the results proved that waters possessed the power of readily nitrifying large quantities of the added ammonia. The thought then suggested itself to Dr. Munro that they would form better media for the study of nitrification than the artificial solutions, which generally become turbid after a short time from the growth of various bacteria. Another advantage possessed by waters is that they contain in solution the salifiable base and mineral and organic matter sufficient for the nutriment of the organism, in such a form as not to impair the transparency of the liquid. But it must be borne in mind that most waters already contain nitrate in small quantity, and this must be accurately estimated before each experiment. For this purpose, Mr. Warington's improved indigo process for the determination of nitrates is the quickest and most reliable.

The first of Dr. Munro's experiments with water were made in the manner following:—Three dark glass bottles were partly filled with 500 c.c. each of water from the river Avon, and 25 c.c. of standard ammonium chloride = 20·6 milligrams nitrogen was added to each bottle.

To the first bottle (*a*) nothing was added but the ammonium chloride.

To the second bottle (*b*) a crystal of Rochelle salt was added.

To the third bottle (*c*) was added a crystal of Rochelle salt and a centigram of soil.

They were then corked, and placed in a dark bureau in a warm room.

The ammonium chloride was added to all three bottles (*a*) to supply the ammonia to be oxidized, which in the ordinary process of nitrification in nature would be produced by decay of organic matter. Rochelle salt was added to (*b*) to supply organic carbon in case there should not be enough in the water itself. Soil was put into the third bottle (*c*) as seed known to contain the nitrifying ferment. On being opened and tested after some time all these solutions were found to have nitrified, but the water (*a*) to which nothing was added but ammonium chloride did so in a much shorter period of time than the other two.

The progress of nitrification in experimental solutions is observed in the following way:—

The solution having been set in a warm dark place, there is a period of incubation, of longer or shorter duration according to the strength of the nitrifying seed. During this time no change is observable.

In about twenty-six days, or sometimes much less, nitrite begins to form; this is qualitatively tested for by adding to about 1 c.c. of the solution in a test tube a few drops of pure dilute sulphuric acid, and then about four drops of the exceedingly delicate reagent, metaphenylene diamine, which shows the smallest trace of nitrite by producing a pale yellow tinge.

If the solution exhibits the presence of nitrite it is examined about every two days with metaphenylene-diamine, and as the nitrite increases the colour deepens, and is described as pale yellow, pale amber, deep amber, nearly red.

The simultaneous decrease of the ammonia as it becomes converted into nitrite is ascertained by adding Nessler reagent to 1 or 2 c.c. of the solution; this in the first testings gives an orange precipitate, then a yellow colour, till finally when all the ammonia is oxidized the addition of Nessler reagent will produce no colour.

Up to the time when the solution shows the deepest colour with metaphenylene-diamine it is said to be "in the ascending stage of nitrite formation;" but now, on continuing to test, the colour daily decreases till at last, if the fermentation be a nitric one, metaphenylene-diamine will fail to produce any colour. This second period is called the "descending stage," and is due to the fact that the nitrite is being further oxidized into nitrate.

The amount of nitrate produced is quantitatively estimated by the indigo process; and should the nitrifying solution be a natural water the amount it originally contained must be deducted from the result.

Dr. Munro now made a number of experiments with waters, such as trying the effect of sterilizing by boiling after the addition of ammonium chloride, adding to one solution chloroform, and to another phenol. All these refused to nitrify. This result, of course, strengthens the ferment theory.

Filtration of water through two Swedish filters into cleansed and sterilized flasks, although apparently weakening the power of the ferment, did not stop the process.

Boiled water seeded with unboiled well or river water nitrified readily.

An experiment with unboiled well water, to which

was added sterilized ammonium chloride, nitrified to nitrite in about fifty-four days, but there was no conversion into nitrate, even after the lapse of two years.

From this it will be seen that sometimes there is a purely nitrous fermentation, and this is generally the case where the organism is weak.

Another fact worthy of observation is that in all the earlier experiments it was considered necessary to add to the nitrifying solution organic carbon in some form or other, such, for instance, as Rochelle salt. But in the first three experimental water solutions which I have described, Dr. Munro was surprised to find that the flask to which no Rochelle salt had been added was the first to nitrify completely, and his subsequent investigations prove that the addition of fermentable organic carbon to solutions, instead of accelerating nitrification retards it by developing bacterial growths other than the nitrifying organism, which tend to produce denitrification.

I now come to the experiments made this summer, in which I assisted Dr. Munro. The object was to find out how far natural waters are impregnated with the ferment; and for this purpose solutions were made up with various waters from the neighbourhood of Bristol. They comprised—

(*a*) A well 56 feet deep in coal measures; water very pure.

(*b*) Well about 40 feet deep in coal measures; badly polluted with recent sewage.

(*c*) Well 70 feet deep in coal measures; this water contained much nitrate, showing oxidized sewage.

(*d*) Water from a level; collected at the outflow.

(*e*) Water of the Bristol Waterworks Company, collected at the mains.

(*f*) Rain water from excavated bricked cistern, water raised by indoor pump.

All these waters I partially analysed to ascertain their condition before nitrification; and in setting up the experiments every possible precaution was taken against accidental contamination.

The flasks of about 350 c.c. capacity were carefully cleaned, first with pure sulphuric acid, then washed with distilled water; they were sterilized by boiling in them distilled water, the necks being plugged with cotton wool through which the steam could pass. After boiling for a short time the distilled water was thrown away, and 5 c.c. of standard ammonium chloride = 5 mm. NH_3 put into each flask, the cotton wool plug inserted, and the ammonium chloride boiled for a few minutes. The mouths of the flasks were then covered with paper caps and they were allowed to cool.

The waters for the experiments were collected by taking these sterilized flasks straight to the supplies, carefully removing the plugs, and either allowing the water to flow directly into the flasks from the pump or tap, or pouring it in, from a sterilized beaker, in the case of open wells.

The necks were then replugged, the paper covers tied on, and the flasks set in a dark place, with the temperature kept to about 80–85° F.

After allowing a sufficient time to elapse for nitrification to commence, the flasks were opened and tested, for ammonia, with Nessler reagent, and for the presence of nitrite with metaphenylene-diamine in the manner I have already described.

Now unfortunately, the temperature of the place where these waters had been set for incubation was one day accidentally raised from 85° F. to 100° F., and all these samples were in consequence sterilized by being overheated, therefore when I opened and tested them, I found that none had nitrified except one which had been in rather a different position and so escaped. I immediately set up duplicate experiments, very carefully regulating the temperature during the incubating period, and these samples all nitrified. This accident, although very annoying at the time, certainly strengthens the evidence in favour of the ferment theory.

The results of these and similar experiments made by Dr. Munro at Downton may thus be summarized.

All natural waters appear to possess nitrifying power, but not all in the same degree; polluted waters stand first. Thus the polluted well water (*b*) ran the complete course of nitrification in the shortest time. Next come surface waters. Lastly water from pure wells which are protected from contamination by the soil possesses the least power.

These results are what we should naturally expect from the fact that the organism is found only near the surface of the soil. The question as to whether very deep wells contain the organism is still an open one, but facts seem to point to the conclusion that they do.

Several practical results are the outcome of these investigations but I will only tax your patience by mentioning one or two which Mr. Warington calls attention to in his report.

It is obvious that as poisons destroy the nitrifying organism, the addition of waste and alkaline liquids to streams near chemical or other works is very undesirable, preventing their purification by the means which nature has provided. Farmers should apply liquid manure to the land in a greatly diluted state, because if too concentrated there is too great an increase of alkalinity, which will prevent nitrification.

After some remarks by the Chairman, Messrs. Millard, Daintree and Bird, a vote of thanks was passed to Miss Munro.

The Reporter on Materia Medica, Mr. E. H. Farr, then explained that his notes for a Report had been anticipated for the most part in "The Month," and consequently he read instead the following—

Note on Liquor Strychninæ, B.P.

BY E. H. FARR.

During the last week of the past year I had placed in my hands a sample of liquor strychninæ, B.P., which had been sent out in the ordinary course of business, and which on keeping had deposited crystals. As two previous complaints of a similar nature had reached us, I was requested to investigate the matter, which, from the powerful nature of the preparation, was of serious importance not only to ourselves, but to pharmacists in general.

The bottle returned had originally held about 48 fluid ounces, but contained only a trifle over 20 fluid ounces when placed in my hands. It contained about a gram of well-formed crystals in addition to the liquid contents.

These crystals after being washed were tested and found to be hydrochlorate of strychnine, as would have been expected. They were then dried and preserved, and are now exhibited.

As the weight of crystals formed no clue to the difficulty, the solution from which they had crystallized was next examined, and was found to contain but 0·815 per cent. of strychnine, whereas it should have contained "about 1 per cent," being thus deficient in strength to the extent of nearly 20 per cent.

It being suspected that the low temperature was the cause of crystallization, a number of experiments were made with a view to ascertain if this were really the case; also how it might be avoided.

With this object in view, four separate pints of solution were made as described below, and they were exposed in a cold place on the afternoon of December 30, and during the following nights until the present date.

1. Made strictly according to B.P., 1885.
2. Same strength, but containing no alcohol.
3. Strictly in accordance with B.P., 1867.
4. Same strength, but without alcohol.

Up to January 1 no crystals appeared in No. 1, but by Monday, January 3, a small crop had formed.

In No. 3 no crystals have formed, so it thus appears that the liquor strychniæ of the old B.P. was a permanent solution.

The two aqueous solutions froze, but on thawing, the alkaloidal salt redissolved spontaneously, the temperature not being raised appreciably above 0° C.

The crystals in No. 1 did not dissolve under similar conditions, so it would seem that water is a better solvent for the salt than is the B.P. mixture containing 25 per cent. sp. v. rect. The exact solubilities, however, have not been ascertained in the present case owing to pressure of other work.

Two other solutions were prepared with the B.P. proportions of alkaloid and acid, but with smaller proportions of spirit, the one containing 20 per cent., the other 15 per cent. of rectified spirit. Up to the present they show no signs of crystallization, though exposed along with the others since January 3, but as the temperature has not been so low it would require further experiment before it could be stated that they would not crystallize.

The object of the present short note is to draw the attention of pharmacists to the fact that liq. strychninæ, B.P., 1885, will, if exposed to too low a temperature, deposit crystals of hydrochlorate of strychnine, and to enjoin on them the necessity of keeping stock of that solution in such a place that it may not be subjected to such conditions.

The above experiments were conducted at the request of Messrs. Wright, Layman and Umney, who have kindly allowed me to publish the results.

The miscellaneous business was opened by Mr. A. Edwards, who criticized an article on quinine pills, by Mr. Clay W. Holmes, which appeared in this Journal (p. 454). Mr. Edwards was of opinion that although syrup and gum arabic formed a very nice mass with sulphate of quinine, the pills hardened so much as to become almost insoluble. He recommended the quinine sulphate to be first mixed with powdered tragacanth in the proportion of 144 parts of the former to 1 of the latter, and then made into a mass with a mixture of 1 part glycerine to 2 parts syrup. For small quantities he found glycerine and tragacanth alone to answer very well. He also objected to the use of tartaric acid for making the pills more compact, on the ground that no substance which might act chemically was admissible as an excipient.

The discussion was continued by Messrs. Jackson, White, Cripps and Bird, after which the meeting adjourned.

Parliamentary and Law Proceedings.

The Fatal Mistake in Dispensing by a "County Drug Company."

The adjourned inquest (see before, p. 562) on the body of Frank Downes Dodwell, aged two years and four months, was resumed on Monday by Mr. Coroner Coren in the Board Room of the Cheltenham Union Workhouse.

Mr. Dighton, recalled, identified the prescription (produced) as the last one he wrote for the deceased.

Richard Thomas Watson, chemist and druggist, High Street, stated that he received the prescription (the last one written by Mr. Dighton) from the father of deceased, and he dispensed it accurately. There was nothing of a poisonous nature mentioned in the prescription.

Mrs. Dodwell, deceased's mother, recalled, stated that she remembered her husband bringing the mixture and powders from Mr. Watson's, and deceased had one dose of the mixture, but none of the powders.

Frank Charles Dodwell, father of deceased, recalled, stated that when he went to the Drug Company's Stores to get the prescription of December 20 made up, and whilst waiting for the powders, Mr. Stuart, manager, came in with his skates and went behind the counter. He spoke to the porter about the best way to get down to Capper's Pond, and the porter told him. A conversation took place between Mr. Stuart and those behind the dispensing counter about skating, but he did not know whether Dudgeon joined in it or not.

Mr. Henry Jessop, surgeon, stated that on December 27 he made a *post-mortem* examination of deceased. The body was that of a healthy, well-devoloped male child, and there were no marks of violence. He found the mucous membrane of the larynx congested, and the lungs were also congested. The heart was healthy, as were also the liver, kidneys and other viscera. The membranes and substance of the brain were a good deal congested, and the ventricles filled with serum. He removed the stomach, which was slightly congested, and contained a small quantity of fluid. This, together with the brain and a kidney, he placed in an earthernware jar, sealed it, and handed it to Sergeant Woolford to transmit to the county analyst. The pupils of the eyes were much contracted.

The Coroner: You have heard the evidence given by the father and mother of the deceased child, and by Mr. Dighton as to the symptoms which they saw in the child, and by the county analyst as to his analysis. Are those symptoms consistent with poisoning by opium?—Yes.

The Coroner: You have heard Mr. Embrey state that the powders contained more than 1 grain of opium each. Would 1 grain of opium be sufficient to cause the death of a child of the age and physique of deceased?—It would be more than enough to cause death in a child of that age and physique.

The Coroner: What, in your opinion, was the cause of death?—Opium poisoning.

Mr. Jessop, in answer to the Coroner, further stated that there was nothing in the prescription given by Mr. Dighton calculated to mislead any person in making it up.

Cross-examined by Mr. Heath: The symptoms which he found on making the *post-mortem* were not similar to those he should have found if deceased had died from croup. If the child had died from croup he would not have found the pupils of the eyes contracted, and the lungs would have been much more congested. This was the only difference.

Mr. Dighton has stated that when he saw the child on the 22nd, after it had taken the opium, it was conscious, and the pupils of the eyes dilated and freely acted to light. Was not the child then overcoming the effects of the opium?—Partially it might, but often relapses occur.

Was it not wholly recovered?—No.

Assuming that it had been still suffering from the effects of the opium, would the second prescription, which is identical with the first, which was given for croup, assist it to get over the opium?—Yes. The prescription was given to cause nausea and vomiting, and the treatment would have been proper in case of opium poisoning, the object being to produce vomiting in each case.

A discussion followed between Mr. Heath, Mr. Jessop, and Mr. Dighton respecting the treatment of persons suffering from opium poisoning, as laid down in Dr. Sidney Ringer's book on Therapeutics.

In answer to the Coroner, Mr. Jessop stated that it sometimes occurs that children suffering from opium poisoning get better, and then have a relapse, and die. It was not an extraordinary—although somewhat unusual—circumstance that the child should have lived twenty-one hours. The average period of life in such cases was about twelve hours. In cases of death from opium poisoning the time varied from one to fifty-six hours after the poison was administered.

Sergeant Woolford proved conveying the stomach, etc., to the county analyst.

Mr. Jessop recalled, stated that there was a case on record in which four grains of compound ipecacuanha powder killed a child of four and a half years. That would be less than half a grain of opium.

James Dudgeon was next called, and was cautioned by the Coroner that he was not bound to answer any

questions. He stated that he lived at 21, Bath Parade, and was 23 years of age. He was employed at the County Drug Company's shop in High Street. He had been employed there nine months as dispenser. He served his apprenticeship to Messrs. Duncan, Flockhart, Powell and Co., of Edinburgh and Leith. He was with them five years as an apprentice, and two and a half years as an assistant at Leith. (A testimonial from Messrs. Duncan and Co. was read, stating Mr. Dudgeon to be "an accurate and quick dispenser," and to have had "a good practical training.") He had dispensed, while at the Drug Company's shop, about fifty prescriptions a day. He had never had any question arise as to his dispensing before. He did not recollect having ever seen the prescription (produced) before, until it was shown to him by a policeman on December 28, but he had no doubt that he dispensed the prescription, and made up the powders prescribed by it. The witness here read the prescription, and acknowledged that it was a prescription for making up simple ipecacuanha powders.

The Coroner: Did you make up the powders according to the prescription?—I have no recollection of what I made up in those powders.

Witness continuing:—The simple ipecacuanha powder is kept in a separate bottle. The compound ipecacuanha powder, which contains opium, is kept in another separate bottle, and we make up the compound powders from that bottle. The one bottle stands at one end of the dispensary and the other at the other. The bottle containing the simple ipecacuanha powder is labelled "Pulv. ipecac." and the compound ipecacuanha powder is labelled "Pulv. ipecac. comp. Poison." The compound powder bottle is darker and heavier than the one containing the simple powder. The bottle containing the simple powder is an 8-ounce bottle, and that containing the powder is a 6-ounce bottle. The bottles are altogether differently shaped. "Ipecac. co." is not considered a dangerous poison, but it is kept with bottles containing dangerous poisons.

Can you tell me from which bottle you made up the prescription?—I have no recollection which bottle I used.

Witness continuing: I should think, from the position which the copy of this prescription holds in the prescription book, that it was made up between five and six in the evening. I was engaged all day in making up prescriptions and tinctures. I had nothing stronger than water to drink on that day. When I made up that prescription I believe Mr. Stuart was talking about skating in a different part of the shop. I was the distance of this room from him, and took no part in the conversation. (The distance referred to would be about twenty yards.) There was no joking or larking going on in the shop, and everything was going on as usual. If I made the mistake, and mixed up the wrong powder, I am sorry, but it must have been from misreading the prescription for compound ipecacuanha powder instead of simple ipecacuanha powder. It is a common thing for practitioners to write "Pulv. rad. ipecac." "Rad." means root. There is nothing in the prescription in question which looks like "rad.," but the word "rad." in the prescription very often helps the dispenser in making up the prescription. It would most likely have assisted me, and prevented a mistake. Prescriptions were written with the word "rad." in my former situation, but I cannot say that any have been written so in Cheltenham. I have passed the Preliminary examination of the Pharmaceutical Society, and consider myself qualified to dispense medicines.

What is the legal qualification for dispensing?—No legal qualification is necessary; Mr. Stuart can employ what assistance he thinks proper. To open a chemist's shop a qualification is necessary.

The Coroner asked Mr. Watson if there was no law requiring that before dispensing medicines a person should pass a certain examination.

Mr. Watson: The Preliminary examination is generally regarded as a school examination, but the Minor examination is generally considered necessary to be passed before chemists will employ assistants to dispense poisons.

The Coroner: There is no law to prevent a person dispensing if he has no qualification whatever?

Mr. Watson: A chemist can engage what assistance he thinks proper. He is generally satisfied if the assistant has a good character and has served an apprenticeship with a good chemist.

The Coroner: That was had in this case. It seems to me that if anybody chooses to employ me to dispense medicine, there is nothing in the law to prevent my being so employed.

Mr. Heath: That is the law.

The Coroner: I think it is quite time there was an alteration in the law.

Mr. Heath pointed out that the law made the person who opened a chemist's shop responsible; it was necessary that a chemist should be duly qualified.

The Coroner: The law as regards the sale of poisons is altogether in a shameful state. It wants a thoroughly radical change from top to bottom. The lives of the public are jeopardized by the lax state of the law on this matter.

Mr. Heath: It is only a few years since chemists have been required by law to duly qualify themselves for their business.

The Coroner observed that nine-tenths of the coroners of the country had had occasion to make similar complaints to that he was now making.

The Coroner, in addressing the Jury, said that it was a case of a very serious description. Whatever the verdict might be, they could not escape the fact—at least, so it seemed to him—the poor child had lost its life through opium poisoning. It was a very serious thing for the public that even by a simple mistake life should be lost. The public were at the mercy of the chemists, and it behoved every chemist to use more than ordinary care and caution. The chemists were a body of repectable men, and he had no doubt that as a rule every care was taken. It sometimes happened—happily not very often—that mistakes were made; mistakes of a fatal character, and then it became the duty of a jury and coroner to inquire into the circumstances attending the fatal mistake and its consequences. There were two questions he would have to submit to them. Was the death of the deceased occasioned or accelerated by the powder which was obtained from the Drug Stores and administered to it? If they were of opinion that it was, then the next thing would be—Was Mr. Dudgeon guilty of gross or criminal negligence in making up the prescription? If they thought that he was guilty, then in law he was liable to be indicted for manslaughter, and it would be their duty to return a verdict of manslaughter. They must, however, be satisfied that there was gross and criminal negligence, or Mr. Dudgeon would not be liable. He then read through the whole of the evidence, and in the course of it said that Mr. Dudgeon had acted very wisely, and was in a very much better position than if he had acted in any other way.

The Jury, after deliberating for about a quarter of an hour, returned the following verdict:—"Deceased died from the opium contained in the powder obtained from the Drug Company's Stores, and administered to deceased, but there is not sufficient evidence to show criminal neglect in the making-up of the powder. At the same time the Jury consider the dispenser deserving of great censure in not having exercised greater care and caution in making up the prescription." The Jury also complimented Mr. Dighton for his wise action in the matter.

The Coroner, addressing Mr. Dudgeon, said: You have heard the verdict of the Jury, and I think you have had a merciful Jury to try the case. You have had a

very narrow escape. I should not have complained if the verdict had been one of manslaughter. I will not say they have taken a wrong view of the case, but it is a merciful view. As a young man just beginning life, I recommend you to be more careful in making up prescriptions in the future. I think you deserve the censure the Jury have passed on you. You must remember that the lives of the public are in the hands of those who make up medical prescriptions, and this is a fatal instance of what may occur through incaution. You take care for the future.

The Coroner then observed that he should impound the prescription in question, and the inquiry terminated, having lasted four hours, or, taking the first sitting into account, nine hours altogether.

Poisoning by Chloral Hydrate.

On Monday last an inquiry was held at the Guildhall, Weymouth, by the Coroner, Mr. G. Symonds, touching the death of Sir William Coles Paget Medlycott, Bart., which had taken place on the previous Saturday morning.

From the evidence, it appeared that the deceased, who was under medical treatment, had, on Friday night, after taking an effervescing draught that had been prescribed for him, taken a bottle out of his travelling bag, and having poured about half the contents into a glass, drank the medicine and went to sleep almost directly. About five hours afterwards he woke up, and, notwithstanding a remonstrance from an attendant who was sitting with him, took another similar dose. He soon went to sleep again, breathing heavily, but in about an hour the breathing suddenly ceased, and upon medical assistance being obtained, it was found that he was dead.

Mr. T. B. Groves, F.C.S., pharmacist, stated that he had received two bottles containing medicines from Supt. Vickery on Sunday. In the small bottle were 32 minims of a syrupy opalescent liquid, and the other bottle he simply examined by taste and smell, and thought it contained a preparation of chloral; but not of the British Pharmacopœia. He analysed 20 minims of the smaller bottle, and obtained 2·44 grains of chloral; making allowance for the size of the bottle he should think that in it were 87·84 grains. Allowing for loss of chloral owing to the smallness of the quantity analysed, and other considerations of a scientific nature, he should think it originally contained 100 grains ef chloral. Theré were no traces of morphia or of bromide of potassium. The presence of traces of tolu proved that the syrup of chloral was not that of the British Pharmacopœia, and that in all probability it formed part of the contents of a larger bottle Sir William brought from Montreal. He should think that one half of the bottle taken in one dose might not cause death, though, in his opinion, the other half taken too soon afterwards would probably cause death to a man in Sir William Medlycott's condition, but this was a medical point and not within his competence.

Dr. Moorhead, on being recalled, said that, in his opinion, death was caused by taking the contents of the small bottle in two doses too quickly in succession, assuming the medicine in the small bottle to be similar to that described by Mr. Groves.

The Jury eventually returned a verdict of "Accidental death occasioned by an overdose of chloral."

The Supply of Chlorodyne.

An application was made to Mr. D'Eyncourt, sitting at the Westminster Police Court, on Wednesday, by a respectably-dressed man, who informed the magistrate that his wife, a woman thirty years of age, was given to taking large quantities of chlorodyne. Applicant stated that the effect of this patent medicine stupefied her, and produced symptoms in many respects similar to intoxication from alcoholic drinks. Ten or fifteen drops was a full dose, but she would take as much as three or four bottles a day. Her mind was being rapidly destroyed, whilst his pocket was being ruined. She spent as much as 6*s*. a day in medicine, and to enable her to do this she had pawned the bedding, his clothes, and other things. In reply to the magistrate applicant said he was a gentleman's coachman, and he was sorry to say his wife had even pledged his master's carriage rug for medicine.

Mr. D'Eyncourt: I should advise you to give notice to the chemists in the neighbourhood not to serve your wife with chlorodyne.

Applicant: I have done so, but she now obtains the narcotic medicines from a co-operative store. I am sure it will kill her if some restraint is not placed upon her. Cannot you give me an order to have her confined in some institution for a time? She is always in a stupefied condition, and her persistency in taking the medicine is bringing me to ruin.

Mr. D'Eyncourt: No. I cannot give such an order. I am, however, sorry that I do not see my way to assist you.

Review.

Outlines of Quantitative Analysis. By A. Humboldt Sexton, Professor of Chemistry in the College of Science and Arts, Glasgow.*

This little book has been written to supply a want which has been felt by the author and others for many years, viz., "a text-book of Quantitative Analysis sufficiently short and simple to put into the hands of students who have but a limited time to devote to the study of practical chemistry," and it is in our opinion well fitted for the purpose for which it was designed. It is strictly confined to its own subject, making no attempt to explain the general principles of chemistry, or the subject of qualitative analysis, but adapted simply for use in the laboratory as a guide in performing quantitative operations. The student is assumed to have already obtained a knowledge of theoretical chemistry and the methods of qualitative analysis, and is first initiated into the use of the balance; he is then instructed to perform some of the simpler gravimetric operations, such as the estimation of moisture, ash, etc., and the taking of specific gravities, passing on to the gravimetric estimations of the principal bases and acids when these occur in a condition which does not necessitate any preliminary treatment.

After a fairly representative set of these exercises comes a course of simple volumetric analysis, embracing the graduation of flasks and pipettes, the correction and accurate reading of burettes, preparation of standard solutions, and titration of acids, alkalies, chlorides, free iodine, iron by $K_2Cr_2O_7$ and by $SnCl_2$, copper by KCy and by $Na_2S_2O_3$, zinc by Na_2S, and phosphates by uranium acetate.

Then follow gravimetric determinations of two or more substances which require previous separation, and finally miscellaneous examples of the application of these processes to the actual analysis of various substances, such as ordinary chemicals, metallic alloys and ores, glass, porcelain, coal, bleaching powder, sugar, etc., etc., Finally instructions are given for the determination of carbon, hydrogen, nitrogen, chlorine and sulphur, in organic bodies, and an appendix includes tables of atomic weights and analytical factors of the commoner elements, specific gravities of solutions of sulphuric and hydrochloric acids and of ammonia, tension of aqueous vapour, etc.

Setting aside a clumsy style of grammatical construction, the book is well arranged and the directions are clear and simple; moreover attention is paid to little details of manipulation, and the student who conscientiously follows the instructions here given ought to become a neat and accurate worker. There is only one point we can find fault with in these manipulations, and

* London: Charles Griffin and Co. 1887. Small 8vo. Pp. i.-xii., 1-132.

that is, that in the estimation of ferrous salts by potassium bichromate the solution is directed to be poured from the flask, in which it is prepared into an open dish for titration, whereas it can be done just as easily and with much less danger of atmospheric oxidation in the same flask. In each case the details of the operation are preceded by a short explanation of the principles on which the method is based, so that the student may have an intelligent appreciation of the reasons for, and result of, each part of the process; the special precautions necessary in any particular operation are also pointed out. Illustrations are given of the best forms and combinations of apparatus to be used, when the process requires any such to be fitted up.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Benevolent Fund.

Sir,—In common I suppose with many others I have read in a recent issue of the Journal your interesting *résumé* of the events of the past year which relate more particularly to pharmacists.

It is not my intention, even were I conscious of the necessary ability, to comment upon any of the events thus summarized; but there is one point which is of such general interest and importance that perhaps, as a young member of the Society, I may be excused for making it the subject of a communication. I refer to the paragraph relating to the Benevolent Fund.

I must confess I was surprised to find that the income of the Fund, at least that part of it which is derived from subscriptions, had again suffered a decrease. The amount received annually in donations and legacies necessarily varies greatly, and is, in addition, so very precarious a source of income, that any diminution in the sum total accruing from subscriptions is a matter for serious consideration. The causes of this deficiency, variously attributed to apathy, want of interest, etc., on the part of chemists and druggists generally, have been so frequently discussed that I shall not further allude to them, but simply offer a suggestion as to the means by which the income of the Fund might be permanently increased.

As is probably the case with the majority of those connected with the Society, who at present occupy the position of assistants, I have not hitherto contributed anything personally to the Fund, having always considered this function as the special duty and privilege of those in business; but the idea has occurred to me that if every assistant, or even a considerable number of them, would contribute annually a small amount (say 5*s*.), not only would the income of the Fund be augmented, and its sphere of usefulness consequently increased, but the habit of subscribing thus formed would naturally, in the transition from assistant to principal, be preserved.

I am perfectly aware that, financially speaking, the position of a pharmaceutical assistant is not usually a lucrative one; but still I cannot think that so relatively small a sum as I have mentioned would be a too severe strain upon his resources, especially if we bear in mind the fact that his tastes are usually quiet, and his habits invariably economical.

Anyhow, here is the suggestion, and as, Sir, the new year is popularly supposed to be an excellent time for the making of good resolutions (unfortunately not always productive of corresponding results), I sincerely trust that the resolution I have come to, to be henceforward a subscriber to the Benevolent Fund, may be adopted by a great number of my fellow assistants. Verbal sympathy is valuable and commendable, but for practical purposes it is desirable that sympathy with any object should not be confined to words, and I am convinced that should the suggestion I have here ventured to make meet with general approval the result could not fail to be of permanent benefit to a Fund, the excellent object and functions of which it would be difficult to overstate.

14, *Rue de la Paix, Paris.* T. Edward Barrass.

What is Laudanum?

Sir,—I cannot bring such learning as Mr. Eagle's to the discussion of this question, but I may venture to say that I am unconvinced by his argument that the word laudanum is derived from the Latin *laus*. He proves indeed (what nobody ever questioned) that before philology existed as a science this opinion was generally held, but he proves nothing more. In opposition to the "authorities" he cites I set the following paragraph from 'Skeat's Etymological Dictionary':—

"Laudanum, a preparation of opium. (L., Gk., Pers.). '*Laudanum* or *opiate laudanum*, a medicine so-called from its excellent qualities;' Kersey, ed. 1715. This remark refers to an absurd supposed connection with Latin, *laudare*, to praise; on which Mahn (in Webster) remarks: 'This word cannot be derived from Lat. *laudandum*, to be praised, nor was it invented by Paracelsus, as it previously existed in Provençal.' The *name*, in fact, was an old one; but was transferred from one drug to another. '*Laudanum*, *Ladanum*, or *Labdanum*, a sweet-smelling transparent gum gathered from the leaves of *Cistos Ledon*, a shrub, of which they make pomander; it smells like wine mingled with spices;' Blount's 'Gloss,' ed. 1674. Spelt *ladanum*, Ben Jonson, 'Cynthia's Revels,' v. ii. (Perfumer). Lat. *Ladanum*, *Ledanum*, the resinous substance exuding from the shrub *lada*; Pliny, xxvi., 8, 30, § 47; xii., 17, 37, § 45. Gk. λήδανον, λάδανον, the same. Gk. λῆδον, an oriental shrub, *Cistus Creticus*. Pers. *láden*, the gum-herb *lada*; 'Rich. Pers. Dict.,' p. 1251, col. 2, last line."

Mr. Eagle appears to think that the earlier a writer's date the more trustworthy his opinion on a matter of this sort, but I have always understood that exactly the contrary is true. Now, except as regards Crollius, Mr. Eagle quoted only opinions; and since Crollius used the word in imitation of Paracelsus, whom he supposed to have invented it, the fact (see above) that Paracelsus did not invent it disposes of him.

And why does Mr. Eagle speak so slightingly of Mathiolus? His evidence, though not in itself sufficient to establish the other derivation, certainly tells in favour of it. We know from him that the juice of the *Cistus* was vulgarly called laudanum in Portugal; according to the 'Encyclopædic Dictionary' it is so still. We know, too, the popular opiate of old times in certain respects closely resembled this resinous juice; we have the opinions of the foremost living philologers that the name was transferred from the one substance to the other; and we know that many other names of drugs have been transferred in a similar way. In the face of these facts Mr. Eagle speaks somewhat boldly when he says that "there can be no doubt about the name laudanum being derived from *laus*."

It is not, however, the derivation, but the authority of the word that Mr. Ellinor and myself are anxious to have determined. Is tr. opii, B.P., the true laudanum? and if so, why so? Your correspondents "Cantiana" and "Minor" speak with a fine indifference to others' scruples; an indifference perhaps based upon ignorance. I have no reason to suppose that my acquaintance with the trade has been exceptionally varied, and yet I have been asked at different times for laudanum, for Sydenham's laudanum, and for Battley's laudanum. I have also had tr. opii, B.P., returned to me by a regular laudanum drinker on the ground that it was not laudanum, she having been accustomed to get some non-official preparation of opium under that name. This was in Nottingham, some twenty years ago. Considering, too, recent legal quibbles as to the identity of sulph. præcip. and milk of sulphur, sp. æth. nit., B.P., and sweet spirit of nitre, etc., etc., I cannot agree that the present position of this question respecting so important an article as laudanum is a satisfactory one.

Epworth. C. C. Bell.

J. Kemp.—The literature of the subject is widely scattered, but you will probably find the information you require in a report of a committee adopted by the Society of Public Analysts (*Analyst*, vol. x., [1885], p. 216).

"*Hyères.*"—The name is one adopted for a proprietary preparation, the formula for which we are not acquainted with.

Communications, Letters, etc., have been received from Messrs. Hesse, Woods, Brown, Dott, Reynolds, Barron, Modlen, Theta.

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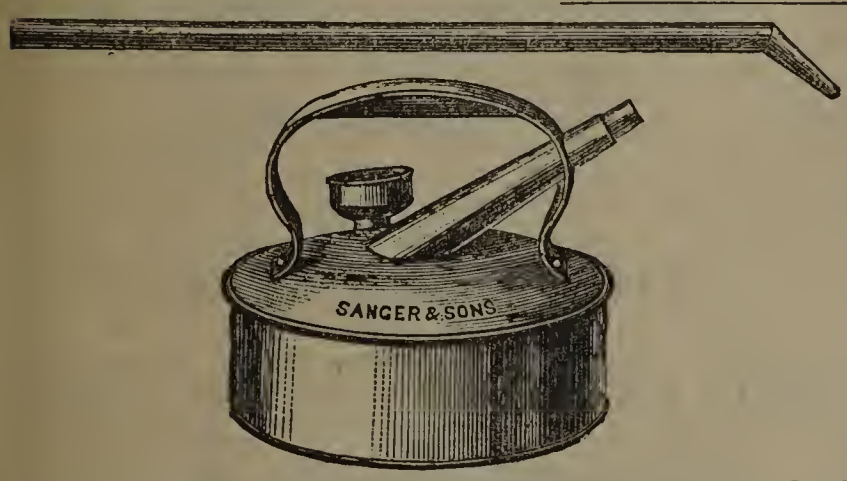

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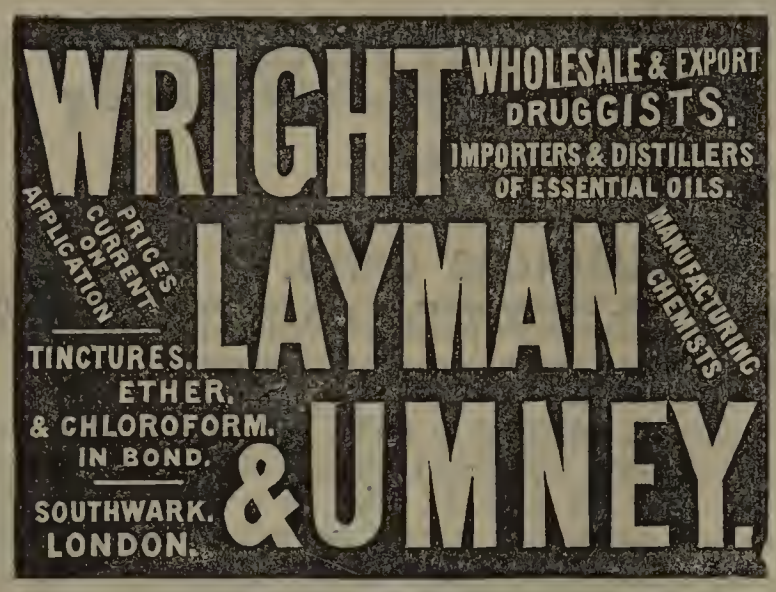

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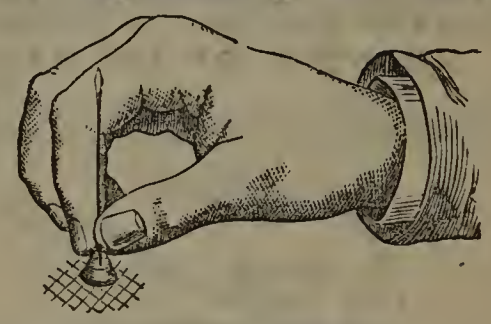

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THE NINETEENTH SESSION, 1886-7.

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„ W. MUSSELWHITE.

MINORS.

Mr. H. T. DOBLE	Mr. J. J. THOMAS
„ E. M. EVANS	„ L. W. STANTON
„ W. E. EVERETT	„ W. O. H. TONKING
„ G. A. HUNTER	„ H. N. WAKEHAM
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„ H. L. OSMOND	„ F. A. WILLCOCK
„ C. J. PALMER	„ J. L. WILLIAMS
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Five Students only presented themselves, the following Four passed:—

Mr. A. G. EVERARD	Mr. W. MARTIN
„ M. HARGRAVE	„ W. W. SMEE

MINOR.

Mr. J. L. ARMITAGE	Mr. E. C. F. GREEN
„ T. E. B. BLANKLEY	„ H. S. HEATH
„ J. R. BENTLEY	„ J. W. HEATH
„ W. J. BAKER	„ M. HILL
„ J. M. CARTER	„ J. HEWITT
„ R. E. K. CALHAEM	„ J. LL. LEWIS
„ W. H. COCKLE	„ A. M. MACDOUGALL
„ A. J. COLLEY	„ H. P. MATTHEWS
„ J. DAVIES	„ C. A. MARRETT
„ G. A. DAVIS	„ H. E. K. PINSON
„ A. P. EVANS	„ A. J. PRATT
„ J. GARIBALDI	

PRELIMINARY.

Mr. H. W. BAKER	Mr. F. R. MITCHELL
„ S. GREEN	„ C. G. RACKHAM

(DECEMBER) MAJOR.

One Student only presented himself and passed.
Mr. C. B. GILSON.

MINOR.

Mr. G. W. BARRATT	Mr. J. W. HICKINBOTTOM
„ W. H. BURRELL	„ J. HUNTER
„ G. W. BLANKLEY	„ S. C. MOYLE
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Mr. Jos. Hindle, York.
„ C. O. Wain, Bolton.

And the under-named in October:—

Mr. J. B. Broadbent, Honley.
„ W. A. Barnaby, Lincoln.
„ J. Sykes, Heaton Chapel.

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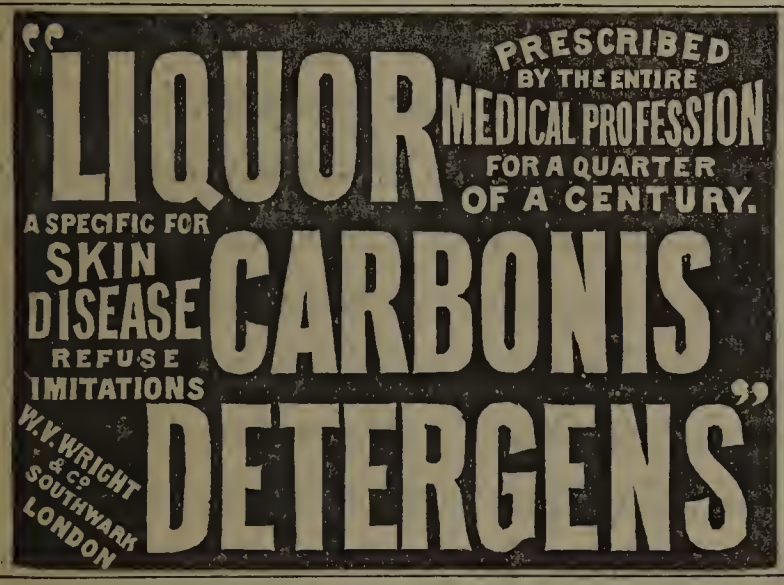

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Royal Courts of Justice,

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(Before Mr. Justice KAY.)

THE "SANITAS" COMPANY *v.* G. CONDY,

trading as "THE G. CONDY'S SANITANT COMPANY," and the "CONDISANITAS COMPANY."

JUDGMENT.

MR. JUSTICE KAY.—In this case the plaintiffs registered as their Trade Mark in 1884 the word "Sanitas" and nothing else, and they registered it as their Trade Mark for Deodorants, Disinfectants and Antiseptics, and then again common starch, blue, washing powder, and other preparations for laundry purposes, and the defendant rejoicing in the name of Condy had some little time ago approached as nearly as he dared to the use of the word in using the word "Sanitants." That occasioned a negociation between him and the plaintiffs, in which it was pointed out that he was trenching probably in using that word on their rights in the word "Sanitas." However, they did not proceed against him to restrain him from using the word "Sanitants," and thereupon becoming emboldened by that impunity he proceeds to use the word "Sanitas," and in order to veil his dishonest intention to acquire the business and profits of somebody else he adds on the letters "C-o-n-d-i," which do not spell his name rightly because his name is "C-o-n-d-y," and he calls his preparation "Condisanitas," which he advertises very largely, and which obviously was intended to lead the public to enquire for his disinfectants, for it was for disinfectants that he advertised this word under the form of "Condisanitas." The purpose is so apparent that I suppose he must consider Courts of Justice to be as blind as they are figured in fables. No tradesman ought to be dishonest, and this act of dishonesty I at once put a stop to by granting an Injunction to prevent him from using the word "Sanitas" in conjunction with the word "Condi," or in any other way which shall be an infringement of the plaintiffs' Trade Mark.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 865.] SATURDAY, JANUARY 22, 1887. [PRICE FOURPENCE.

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Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, February 2nd, as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

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The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

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MAW, SON & THOMPSON	Price Current	
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Disinfecting Fluid; "Crude Sanitas;" Oil; Emulsion; Insecticide; Sheep Dip; Powder; Hard, Soft, Brown Windsor, Toilet and Animal Soaps; Soap Powder; "Sanitas Jelly;" Veterinary Ointment; Tooth Powder; Toilet Powder; Toilet Fluid; Furniture Cream; Antiseptic Gauze; Fumigators. **GOLD MEDALS, CALCUTTA, 1883-4, and PARIS, 1885.**

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EQUAL TO AND CHEAPER THAN VASELINE.

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1 lb. Jars	,,	6/2	per doz.	74/0	2 oz. Jars	,, 7/0	,, 10/6
½ lb. Jars	,,	6/4	,,	38/0	1 oz Jars	,, 7/8	,, 5/9

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A NOURISHING MEAT AND MALT WINE COMPOUND.

A stimulating tonic nutrient. Dose—¼ to 2 ounces twice daily.

In Bottles, 2s. 6d., 5s., and 7s. 6d.

Of all Chemists and Wine Merchants, and the Manufacturers,

HOOPER & COMPY., Chemists, &c.,

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ACID. ACETIC., B.P., ACID. ACETIC. 1·040. Guaranteed made from Soda.
PEROXIDE OF HYDROGEN, for Bleaching Feathers, Hair, Silk, Jute, Ivory, Bone, &c.
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The original Manufacturers of Essence of Beef (green label under wrapper), and other Specialities for Invalids, have

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From their SOLE ADDRESS, No. 11, Little Stanhope Street, Mayfair, W., and caution the trade to

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"THE BEST NATURAL APERIENT."

Persistent attempts are made by interested parties to deceive the public by offering Natural Mineral Aperient Waters with marks, names, and designations very similar to those which are used by the **APOLLINARIS COMPANY, LIMITED,** for their **NATURAL MINERAL APERIENT WATER.**

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1s. 6d. per Dozen.
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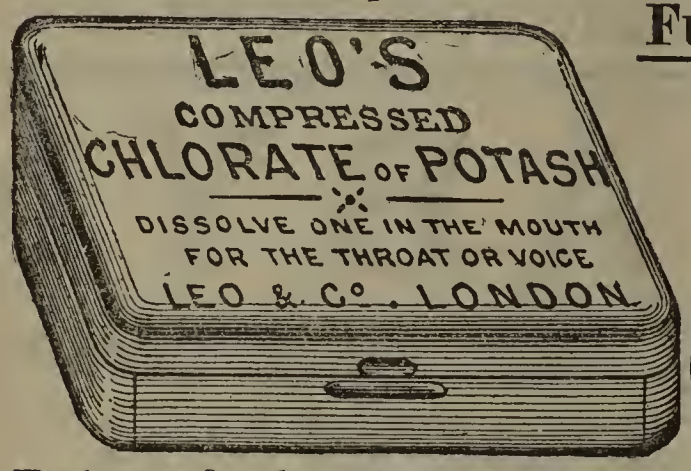

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These afford the largest profit of any cheap Compressed Goods in the Market.

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And is sold in bottles, authenticated by a Government Stamp bearing their Names and Trade Mark, **"Henry's Calcined Magnesia."**

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SHIRLEY'S MENTHOL CONES.

25/- worth of SHIRLEY'S A 1 BRAND MENTHOL will realise 48/-, or a Profit of 23/-, which is over 90 °/₀; therefore send a cheque for 25/- and I will forward either of the following parcels:—

PARCEL A.	PARCEL B.	PARCEL C.	PARCEL D.
4 doz. 6d.	3 doz. 1/-	8 doz. 6d.	4 doz. 1/-
2 ,, 1/-	2 ,, 6d.		

together with a Handsome Glass-fronted Show Case and Round Handbills, which are bound to increase the sale.

Order as A 1 BRAND, *of all Wholesale Houses, or direct of*

ARTHUR W. SHIRLEY (late J. G. Shirley)
30, Paternoster Square. E.C.

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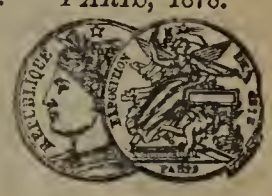

The Jury of the International Exhibition, Paris, 1867, awarded to BOUDAULT'S Preparations the *only* Medal given for Pepsine. Since that time it has taken the Medal at each of the International Exhibitions—Havre, Lyons, Vienna, Philadelphia, and Paris, 1878.

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CAN BE HAD OF ALL CHEMISTS.

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Guaranteed pure and soluble,

Is simply unequalled and, although a little dearer, really the cheapest in the end.

A cup of **this** cocoa costs no more than a cup of tea, and is **a highly nutritive** beverage.
Digested with marvellous facility by the most delicate invalids and children.
Made instantly with boiling water.
The **British Medical Journal** says:
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Invaluable in railway stations, hospitals, on board ship, in the camp, for workmen (at home and to take to their *work*), etc., etc.

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Sample tins free through your grocer or chemist.

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We supply our celebrated 6 and 8 ounce Bottles at 8s. per gross. Name and address can be had on them if required, *no extra charge.* Also our white moulded Phials at very low prices. Send copy of order required, and get estimate from us before ordering of any other house.

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Established upwards of 50 years.

The Pharmaceutical Journal and Transactions
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SPIRITS OF WINE CHEMICALLY PURE

The Best English Grain Spirit, free from Fusel Oil.

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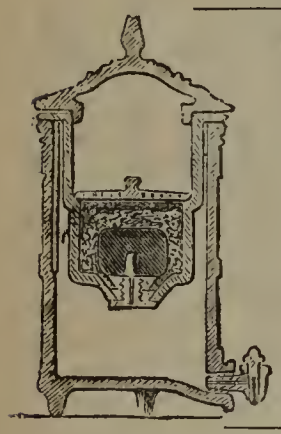

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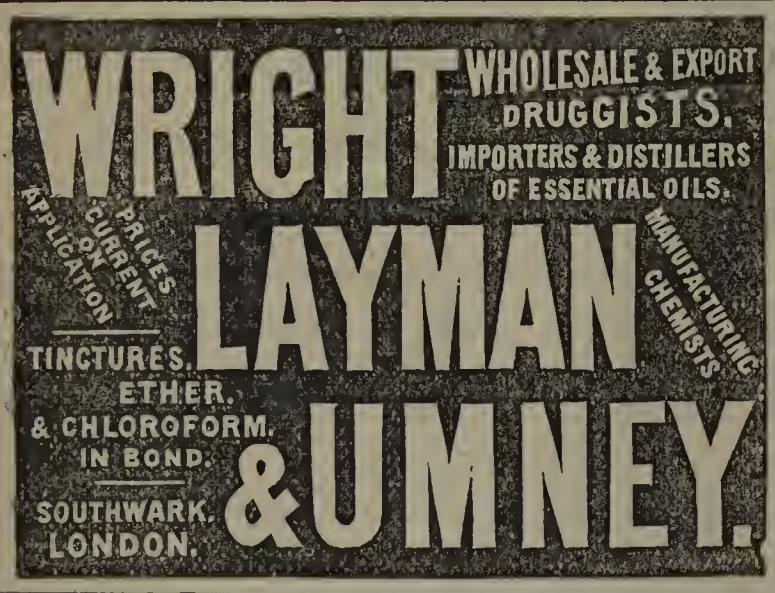

LITHIA, with Potash or Ammonia.
CITRATE OF POTASH WATER.
POTASH AND SODA, B.P.
MINERAL ACID WATER.
PURE LEMONADE AND GINGER ALE.
Sole Makers of Stevenson's Aërated Lime Water.
The above may be had in Bottles or Syphons.
Orders for 6 dozen carriage free.
HOGG & SON, 1, Southwick Street, Hyde Park, W.

GOLD MEDALS, DUBLIN, 1882; BOSTON, 1883; LONDON (INT. EXHIB.), 1884.

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FLUID MAGNESIA

The Original Preparation of the Inventor,

Has been in use for over 60 years as an excellent remedy in cases of **Acidity, Indigestion, Heartburn, Gravel and Gout.**

Sold by all Chemists in Large-sized Bottles (the 1s. size containing just double the quantity usually sold at same price) at 1s., 2s. 6d. and 3s. 6d. each.

CAUTION.—Observe the signature of the Inventor on every label.

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BARCLAY & SONS, 95, Farringdon Street, London.

Please see that YOUNG'S goods are supplied, as there are many worthless imitations. [2]

The Original Arnicated Corn and Bunion Plasters.

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HENRY YOUNG, Manufacturer, LONDON

FOUND DEAD BY SANFORD'S RAT POISON. "I have found 145 rats killed in my farm buildings by it."—C. Wilson, Offord. "It is the most certain remedy I have ever tried. Little pellets about the size of a pea are put in the rat holes or in their runs. I destroyed over 200 rats from one dressing with it."—C. Cook, Grange Farm, Ellesmere, Salop. It is, without doubt, the best ever introduced. **Price 6d., 1s., 2s., and 3s., of Chemists. Sanford's Mice Poison** for Houses, Buildings, Corn Stacks, &c. Cannot be excelled. Has given entire satisfaction for the past 28 years. In packets **3d., 8d., 1s.,** and **2s.** each, with directions for use, of SANFORD & SON, Sandy, Beds. Liberal terms to Chemists. Wholesale of BARCLAY & SON, SANGER & SON, NEWBERY & SONS, EDWARDS, and others, London (England).

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Coloured Side Mark, Label, and other Speciality Capsules

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As supplied to Bass & Co., Hennessy & Martell, Cognac, and the leading Brewers and Bottlers of Wines and Spirits throughout Europe.

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From **1s.** per lb., and upwards. **MIXED FOIL** (Foreign Quality), from **6d.** per lb. (according to gauge).

PATENT BARREL PACKAGES AND SNUFF CANISTERS, TEA PACKAGES, &c.

COLLAPSIBLE TUBES AND SPRINKLERS

FOR PERFUMERS AND OTHERS.

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Hydraulic and Mechanical Pressure Capsuling Machines,

ESPECIALLY ADAPTED FOR CHEMISTS' COUNTERS,

Largely in use by the Trade, and efficiency guaranteed for all sizes of Bottles, at Royalties from **5s.** to **£2 2s.** per annum.

DR. MICHAELIS'
TONIC COCOA.

Made from pure Cocoa of the finest quality, combined with a soluble extract of acorns, and free from Cellulose.

Recommended expressly for Catarrhal Affections of the Digestive Organs, also for Chronic and Infantile Diarrhœa. A Tonic, Nutritious, and Digestive daily beverage for children and persons of all ages, and especially useful in convalescence and for persons suffering from debility.

"Has a pleasant flavour like chocolate, never palls upon the palate; rapidly improves the condition of the children in cases of diarrhœa and their state of nutrition. In extensive use in Germany as a beverage both for children and for adults."—*British Medical Journal*, July 31st, 1886.

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☞ *Samples for trial will be forwardea on application to Medical Men and Public Institutions.*

FLETCHERS' Permanent! CONCENTRATED UNIFORM! ECONOMICAL! LIQUORS.

Any Quantity of a required Syrup at a moment's notice.

In Daily Use in Pharmacies and Dispensaries throughout the World.

May be obtained through any Wholesale Drug or Patent Medicine House.

When Ordering, please Specify "FLETCHERS."

LIQUOR Ferri Iodidi.

EACH fluid drachm contains 34.4 grains of Iodide of Iron.

ONE volume added to seven volumes of *Syrupus, B.P.*, forms Syr. Ferri Iodidi of full Pharmacopœia strength.

Liquor Ferri et Quiniæ et Strychniæ Phosph.

EACH fluid drachm contains 4 grains of Phosphate of Iron, 4 grains of Phosphate of Quinia, and $\frac{1}{8}$ grain of Strychnia.

ONE volume added to three volumes of *Syrupus, B.P.*, forms Easton's Syrup.

LIQUOR Calcis Lactophosph.

EACH fluid drachm contains 8 grains of anhydrous Calcium Phosphate combined with Lactic Acid.

ONE volume added to seven volumes of *Syrupus, B.P.*, forms Syr. Calcis Lactophosph.

LIQUOR Ferri Phosph.

EACH fluid drachm contains 8 grains of Ferrous Phosphate.

ONE volume added to seven volumes of *Syrupus, B.P.*, forms Syr. Ferri Phosph.

LIQUOR Ferri Phosph. Comp.

EACH fluid drachm contains, in addition to the alkaline Phosphates, 4 grains of Phosphate of Iron, and 8 grains of Phosphate of Calcium, dissolved in pure Phosphoric Acid.

ONE volume added to three volumes of *Syrupus, B.P.*, forms "Chemical Food."

LIQUOR Ferri Hypophosph.

EACH fluid drachm contains 8 grains of Hypophosphite of Iron.

ONE volume added to seven volumes of *Syrupus, B.P.*, forms Syr. Ferri Hypophosph.

Fletcher, Fletcher, & Stevenson,

North London Chemical Works, Holloway, London, N.

COMPOSITION OF NEUTRAL QUININE CHROMATE.

BY DR. O. HESSE.

According to Dr. de Vrij his new chromate test will serve not only for the purpose of determining with great accuracy the cinchonidine in quinine sulphate, but also for the determination of quinine itself. For the latter purpose it is said to be merely necessary to dissolve 5 grams of quinine sulphate in 500 c.c. of hot water, adding then a solution of 1·2 gram of neutral potassium chromate in a little warm water and after leaving the whole to cool for twelve hours the crystals of quinine chromate that are deposited are collected upon a filter washed with distilled water and weighed after drying in the air. But since quinine chromate is not quite insoluble in water there is to be added to the observed quantity for every 100 c.c. of mother liquor and wash water a further quantity 0·05 gram, in order to ascertain the actual quantity of chromate that the sulphate in question will yield, and upon that basis the calculation of the result is to be carried out in accordance with the formula $(C_{20}H_{24}N_2O_2)_2$, CrO_4H_2, which de Vrij states that he has found to represent the composition of the quinine chromate.

Having from various reasons been forced to entertain a doubt whether the foregoing could be a correct formula, I have undertaken the examination of the salt for the purpose of ascertaining that point. It was prepared from chemically pure quinine sulphate strictly according to the conditions above mentioned, and dried by exposure to the air at a temperature of about 30° C. At 60° C. the salt was found to remain constant in weight, and likewise also in the exsiccator. When, however, it is gradually heated up to 80° or 90° water of crystallization is disengaged and then it again becomes constant in weight though at last the salt may become somewhat dark-coloured, owing to incipient decomposition. At a still higher temperature the salt melts and then runs into a dark green mass.

The following results were obtained on analysis of the salt when dried either in the exsiccator or by exposure to the air:—

0·426 gave at 80° to 90° 0·018 H_2O.
0·410 „ „ „ 0·018 „
0·2873 „ 0·632 CO_2 0·1745 „ and 0·0268 Cr_2O_3.
0·562 gave 0·4532 quinine.

By calculating on these data the formula by which the composition of the salt is to be represented, it will be found to be $(C_{20}H_{24}N_2O_2)_2\,CrO_4H_2 + 2H_2O$, which corresponds with the following percentages:—

	Required.	Observed.	
$2H_2O$	4·48	4·32	4·38
C	59·82	59·99	—
H	6·73	6·88	—
Cr_2O_3	9·51	9·32	—

The molecular weight of neutral quinine chromate is not therefore 766·5, as de Vrij represents it to be, but 802·5. This error will to some extent help to explain how it is that several chemists in following this method of testing have found that they seemed to obtain more quinine than they took to operate upon.

Note.—The error pointed out in the foregoing paper has probably arisen from want of due precaution in weighing the quinine chromate after it has been rendered anhydrous by heating it up to 80° C., the fact being that the dehydrated salt, when exposed to the air for only a very short time, rapidly reabsorbs water, and again attains the same weight which it had before being dried. The consequence of taking the chromate to be an anhydrous salt in the calculation of the results of analysis by this method is to bring out the amount of quinine sulphate as between 4 and 5 per cent. higher than it would be if the correct formula of the chromate were made the basis of the calculation. The mistake that has been made would thus have the effect of rendering Dr. de Vrij's new method of testing a device for concealing the presence of about 5 per cent. of the impurity sought for. This is the amount held to be admissible by the British Pharmacopœia, and is about the amount of cinchonidine sulphate present in "ordinarily good" commercial quinine sulphate. Another serious objection to this method is the very considerable addition that is to be made to the ascertained weight of the quinine chromate in order to allow for the portion remaining in solution. This addition, as recommended by Dr. de Vrij, amounts to no less than 5 per cent. of the total quantity of quinine sulphate operated upon, and is a quantity precisely equal to the average amount of the impurity to be tested for. —Ed. Pharm. Journ.

KERNER'S QUININE TEST,*

With Special Reference to the Form in which it is applied in the French Codex.

BY E. JUNGFLEISCH.

The recent discussions upon the purity of quinine sulphate of commerce have induced me to lay before the Pharmaceutical Society of Paris sundry observations that I have already mentioned in a cursory manner in a report read to the Academy of Medicine. The point to which I shall refer especially is the test prescribed by the official pharmacopœia as a slightly modified application of the principle involved in Kerner's test. As it stands in the Codex of 1884 it certainly leaves much to be desired, but it does not merit all the censure that has been bestowed upon it. Though a delicate test, and in some respects even too delicate, it is nevertheless susceptible of being made use of by every pharmacist. It has, moreover, a characteristic which I should like to believe is ephemeral, but which may for the time be allowed to cover all its defects: among the tests which admit of the detection of the alkaloids most usually mixed with quinine sulphate it is still the least imperfect, the most simple, and the most expeditious.

Of all the criticisms that have been passed on this test the most telling is that relating to the preparation of the saturated solution of quinine sulphate at 15° C., charged also with the more soluble salts of alkaloids other than quinine.

The Codex directs that the quinine sulphate to be assayed shall be heated with water, but it does not specify the temperature. This criticism is well founded; it points out an omission that needs to be made good, and for that reason the Pharmaceutical Society of Paris has under consideration the provisional fixing, by a kind of convention, of a temperature at which the solution should be made. It may be useful to remark, however, that the decision to take this step would depend chiefly upon the demands to be made as to the purity of the official salt, but that, on the other hand, the fixing of that tempera-

* *Journal de Pharmacie et de Chimie*, [5], xv., 5.

ture would not give the process all the precision which some persons appear to hope. This is a point that deserves to be investigated.

In general I have operated at a temperature of 60° C., which corresponds sufficiently well to the too vague expression in the Codex; but in principle I see no inconvenience in adopting any higher temperature, even that of boiling water, which has the advantage of being easily applied and kept constant. I even propose to show that the boiling temperature should be adopted, and also that the other conditions of the test should be rendered more stringent if it be desired to require the complete purity of the official quinine sulphate, while, on the contrary, if it be admissible to tolerate in that salt a small proportion of foreign alkaloids, the tolerance will be so much the less in proportion as the temperature adopted is higher. The misconception of these conditions lies at the root of most of the discussions raised on the subject, and of the objections urged against the method of assaying in question.

If evidence of the purity of the salt is to be obtained, it is clear that in order to test it the whole of the foreign salts that are to be detected must be made to pass into solution. It is therefore necessary to dissolve as much as possible of the crystals, or, in other words, to raise the temperature as much as possible. It has been contended that if the solution is made with heat above the temperature of 35° C., even pure quinine sulphate will not answer the requirements of the Codex test, the reason being that the hot solution remains supersaturated after being cooled to 15° C. But it is easy to prove that the experiments upon which that statement has been based were made with very impure quinine sulphate. Moreover, the suggested explanation is no more admissible than the statement of the alleged fact, for a saline solution cooled, as in this case, in contact with a large quantity of crystals of the salt in solution, would not remain supersaturated.

When, in short, the Codex test is applied to really pure quinine sulphate by heating on a water-bath to 100° C. in making the solution, the liquid obtained will remain limpid after the addition of ammonia just as well as when the temperature has been raised only to a much lower degree. But that is not all, and when in that case, operating either with or without heat, the ammonia (0·96 specific gravity) is gradually added to the 5 c.c. of the properly cooled solution, it will be found that in order to dissolve the precipitate at first formed it is not requisite to use the 7 c.c. of the reagent ordered by the Codex, but that a much less quantity, about 5·5 c.c., will be found sufficient for restoring the clearness of the liquid.

This very simple experiment furnishes a conclusive answer to the objection above mentioned, and it justifies my second proposition, that if the official salt is required to be completely pure the Codex test must be modified, not only by carrying the temperature to 100° C., but also by limiting to nearly about 5·5 c.c. the volume of ammonia solution of 0·96 that is to be added for the purpose of rendering the liquid clear after precipitation.

It is sufficient to read the article in which the Codex treats of quinine sulphate to recognize that its editors have taken a different point of view. They have only demanded for this salt a relative purity. This is evident from the indications given for ascertaining "the presence of an inadmissible proportion of alkaloids other than quinine." But if the authors of the official pharmacopœia hesitated to insist upon the complete purification of an industrial product, in regard to which certain consumers had themselves acquired usages difficult to abandon suddenly, they nevertheless very clearly showed, by the nature and the number of the tests prescribed, their intention to induce French pharmacists to exercise increased vigilance in this particular. But however that may be, a test admitting of a certain degree of tolerance is the point of more special interest at the present moment.

The quinine sulphate of commerce retains foreign bases in two ways. First, the surfaces of the crystals are moistened with a certain quantity of mother liquor which imperfect draining has not removed, and that has afterwards dried upon them. Second, the crystals formed in a liquor, charged with cinchonidine sulphate, for example, have entangled some of the latter salt, and sometimes a considerable proportion of it.* In treating quinine sulphate to be tested as Mr. Kerner directs in one of the forms of his test, with cold water, the water readily becomes charged with the soluble salts left by the mother liquor on the surfaces of the crystals, but it does not come sufficiently into contact with the cinchonidine sulphate entangled among those crystals, and that is consequently protected from the action of the solvent by the sparingly soluble quinine sulphate amongst which it is intimately mixed up. When the mixture is heated gradually the proportion of quinine sulphate dissolved goes on increasing, and a larger quantity of the cinchonidine sulphate passes into solution in such a manner that, from the circumstance of the two salts being mixed in the crystals, the quantities dissolved of each are correlative. The volume of water used being insufficient for dissolving even at 100° C. the whole of the quinine sulphate, a very notable part of the impurities will also remain undissolved, and not come within the scope of the subsequent operations. By cooling the solution to 15° C. almost the whole of the quinine sulphate crystallizes out, taking with it some of the cinchonidine salt; but the greater part of this latter salt remains in solution. The quantity of cinchonidine salt transferred to the solution is thus increased in proportion as the heating is augmented. It can easily be ascertained that this is what happens, by making several tests with the same sample of impure quinine sulphate, and applying different temperatures for the solution. It will thus be found that the volume of ammonia necessary for redissolving the bases liberated will be increased in proportion as the temperature applied is higher. This may also be ascertained by comparing the weights of the dry residues left on evaporating equal volumes of the solutions obtained when different degrees of heat are applied in the testing operation. M. Marty has in this way shown that the quantity of the residue is greater in proportion as the heating is greater.

* The tendency of quinine sulphate and cinchonidine sulphate to crystallize together is very marked. When quinine sulphate mixed with a few hundredths of cinchonidine sulphate is dissolved in boiling water, and even when the volume of the solvent is many times more than would be sufficient in the cold to dissolve the whole of the cinchonidine salt if it were in a separate state, the latter salt will partially crystallize with the quinine sulphate during the cooling of the solution.

In short, the delicacy of the test is so much greater as the solution is made at a higher temperature, and the selection of a particular temperature should be regulated according to the greater or less demand for proof of purity in the official quinine sulphate.

It has also been said that this mode of testing when carried out with heat involves the demand for an exaggerated degree of purity incompatible with the industrial production of quinine sulphate. One of the experiments cited above is sufficient to prove the contrary. It will be remembered in fact that pure quinine sulphate, treated with warm or even boiling water, gives a solution, 5 c.c. of which, when cooled to 15° C. became quite clear on addition of about 5·5 c.c. of ammonia solution (0·96). But the Codex does not require this result to be produced by less than 7 c.c. of ammonia solution; the difference of 1·5 c.c., or more than one-fifth of the whole quantity, being available for the solution of bases other than quinine in the event of their being present. This difference represents therefore the tolerance of the prescribed test.

If it be attempted to appraise that tolerance by expressing the quantity of foreign bases that may be present in quinine sulphate which is shown by the test to be acceptable, the result will be a failure. Hitherto I have supposed, for greater simplicity of exposition, that the impurity is exclusively cinchonidine sulphate. This is at the present time most frequently the case, but, sometimes, other bases also occur in the commercial product, though less frequently. Those bases, being unequally soluble in ammonia, the delicacy of the test in reference to each one of them will be inversely as their solubility, and the tolerance will be variable.

Nor is this all, for in considering only the admixture of cinchonidine, and admitting a fixed temperature, say 60° C. for instance, as being adopted in practice, that is to say, by reducing the problem to the most simple form, it is still impossible to arrive at a perfectly satisfactory conclusion. When 1 gram of quinine sulphate is treated with 10 c.c. of water, the solution is only partial even at 100° C., and the interior parts of the crystals escape the action of the solvent entirely.

Under these conditions it will happen that for a given amount of cinchonidine in a sample of salt tested, if the impurity arises solely from imperfect draining off of the mother liquors and is superficial, the proportion of cinchonidine that will pass into the solution will be greater than if the impurity be due to cinchonidine actually in the crystals. Consequently the delicacy of the test would be greater in the former case than in the latter and the tolerance would be less in that case. Moreover, when it is noted that the crystals vary in size and present a varying surface, that they are not generally homogeneous, that the distribution of the cinchonidine through the interior of them necessarily alters according to the circumstances of the crystallization, etc., it is impossible to avoid recognizing that the tolerance to be appraised will have a considerable range of variation. Therefore, I cannot express by figures having any precision the increase of the tolerance corresponding with the application of the test at temperatures between 15° and 100° C. With cinchonidine sulphate as the sole impurity, and taking 60° C. as the temperature for making the solution, the quantity of foreign substance passing unnoticed appears to vary between 4 or 5 per cent. The magnitude of this amount may perhaps be an argument in favour of raising the temperature to be adopted; but this is a point which I merely mention here as deserving consideration. When the test is applied without heating, as the German Pharmacopœia directs, the tolerance may amount to 12 per cent., or even more than that.

The foregoing remarks must be understood as applying to the quinine sulphate of commerce. The figures obtained by various authorities with mixtures prepared for the purpose are not applicable to the mixed crystallization of the commercial salt.

There are certain other objections of secondary importance which appear to me as being well founded in reference to the method of testing used in question.

I have already pointed out that considerable precision is required in carrying out the details of the operation, and especially in the measurement of the volumes of the liquids used.

I may also add that the temperature of 15° C., at which the solution has to be kept for some time, is not always readily obtainable, especially in summer, without having recourse to some means of artificial refrigeration.

Another small difficulty arises from the physical condition of quinine sulphate, owing to which it mechanically retains the aqueous liquid with which it is mixed, and does not always allow the separation by means of a paper filter of the volume necessary for the treatment with ammonia. The result required may, however, be easily obtained by making use of a filtering apparatus formed of a funnel fitted with a plug of cotton wool, and fitted by a perforated cork into the neck of a tubulated flask, so that the solution may be sucked out from the crystals.

Another point of more importance is the strength of the ammoniacal solution being precisely regulated to the requirements of the test. If, for instance, it were used of a specific gravity of 0·925, considerable errors would result, and the quinine sulphate represented as being acceptable for use under such conditions would in reality be very impure. It is therefore impossible to lay too much stress upon the importance of accuracy in the preparation of the ammonia solution.

The Codex has stated in a note the error that may be caused by the application of the test to an effloresced salt. A pure salt, whether effloresced or not, will never be mistaken for an impure one when the test is applied to it in accordance with the directions of the Pharmacopœia; it may even be remarked that if complete purity had been required in the official salt, the weighing of the quantity taken for testing would have been superfluous, for the solution after recrystallization at 15° C. ought always to give a clear liquid on the addition of ammonia, however much of the salt was operated upon. But since a certain tolerance is allowed for the manufacture the case is altered in this respect. If the sulphate has lost by efflorescence some part of the water which it should contain in the normal condition, one gram of it will represent a proportionally larger quantity of the fully hydrated salt; the impurity passing into solution would thus be increased in quantity and the tolerance diminished. In such a case the best plan is to dry the salt completely at 100° C., and to take a quantity weighing ·8555 gram

instead of one gram, as the Codex recognizes that the salt should contain 14·45 per cent. water of crystallization. At the same time it should not be forgotten that in effloresing, the crystals undergo a disintegration which renders the material especially fit to be acted upon by water as a solvent, and this will tend to diminish the tolerance.

Recently Kremel has pointed out a possible modification of Kerner's test, based upon the circumstance that the solutions of the sulphates of cinchona alkaloids saturated at a temperature of 15° C. contain different quantities of these salts as follows :—

5 c.c. of solution.	Contain.
Quinine sulphate . .	0·0062 gram of the salt.
Quinidine „ . .	·0464 „ „
Cinchonidine „ . .	·0510 „ „
Cinchonine „ . .	·0925 „ „

Consequently, the same measure of the solutions also contain very different quantities of sulphuric acid, and as the alkaloids in question do not react upon phenophtalein it is possible to titrate the sulphuric acid in a solution of quinine sulphate, with an alkaline solution as well as if it was in a free state. The quantity of sulphuric acid found in a solution of pure quinine sulphate would be very much less than in a solution of an impure sample, and in this way the amount of impurity might be ascertained.

The sources of errors already referred to as being inseparable from the preparation of the solution saturated at 15° C. from the commercial quinine sulphate would obviously exercise the same kind of influence upon results obtained by the method proposed by Kremel as upon those obtained by the method of the Codex. A further error would also be made by taking the quantity of sulphuric acid as being in constant proportion to that of the anhydrous sulphates, even when the bases of those salts were not isomeric, the molecular weight of cinchonidine sulphate being 718 and that of quinidine sulphate 746. Another error would result from the identification, from the point of view of foreign material, of cinchonine sulphate with two molecules of water of crystallization (molecular weight 754), with cinchonidine sulphate containing six molecules of water (molecular weight 794).

Some time ago Dr. Hesse pointed out a method of testing, which differed in principle from that of Kerner as applied in the cold only, in using another solvent for the alkaloids, ether being substituted for ammonia for this purpose. This mode of testing has been slightly modified by Schaefer and recommended by him in the following form :—A gram of the quinine sulphate to be tested is heated with 20 c.c. of distilled water to the boiling point, and, after being allowed to cool, 5 c.c. of the clear filtered liquid is placed in a well-corked tube with 1 c.c. of ether and five drops of ammonia and then well shaken. If after the lapse of twenty-four hours there is no separation of crystals from the ether solution of the alkaloid, the quinine sulphate is considered to be acceptable for use as pure. But even with this modification, the test in question, although possessing some delicacy for detecting cinchonidine, has not this advantage in regard to quinidine, which is somewhat freely soluble in ether. It must not, therefore, be forgotten that although cinchonidine is at the present time the most ordinary impurity of quinine sulphate, the salt prepared from cuprea bark does not contain any cinchonidine, but a very considerable proportion of quinidine.

The testing of quinine sulphate by means of the polarimeter having had and still having many partisans, I venture to state here the reasons for which I consider that this method of testing is a bad one. I shall show that it is very much wanting in delicacy, and besides this, that it may give rise to very considerable errors.

There is no doubt that quinine sulphate possesses a specific rotatory power peculiar to it, which is susceptible of being applied for ascertaining the purity of the salt. This rotatory power being the highest among those of the lævogyrate sulphates of the cinchona alkaloids, being, in fact, a maximum quantity, its application for the purpose presents an especial advantage. If, therefore, the quinine sulphate employed in pharmacy were to be perfectly pure, that method of testing, with more or less delicacy, would be applicable for the purpose in view.

But when it is requisite to allow manufacturers a certain tolerance, and in consequence of this to ascertain whether the salt to be tested is contaminated with foreign substances in proportion above or below a fixed limit, the case is no longer one of the same nature. Some very simple calculations will suffice to show this, and I shall for this purpose make use only of the figures furnished by M. Oudemans, and take for illustration the experiments made under the conditions of dilution for which those figures have been found.

In calculating for a length of column of 2 decimetres the deviation produced by 0·436 gram of the alkaloid sulphate dissolved in 20 c.c. of absolute alcohol the following results are obtained. The deviation is $\alpha_D = -6{\cdot}86°$* for the neutral crystallized quinine sulphate, and for the neutral crystallized cinchonidine sulphate it is $\alpha_D = -5{\cdot}17°$.†

Therefore the deviation produced by any mixture of these two sulphates will lie between these two extreme limits. One hundredth part of the difference between the two figures (1·69°) would be 0·0169, and that would be the influence exercised by the presence of 1 per cent. of cinchonidine sulphate, more or less in quinine sulphate. I believe that this relation between 17 thousandths of a degree and each hundredth part of cinchonidine sulphate more or less in the mixture will render sufficiently appreciable the delicacy of this method of testing. But the method has still another defect of very much greater significance.

If pure quinine sulphate be mixed with one hundredth part of quinidine sulphate, a highly dextrogyrate salt, the deviation calculated for the same conditions would be for $\alpha_D = -6{\cdot}701°$,‡ and that is precisely the result which would be obtained with a mixture of 90·83 quinine sulphate with 9·17 of cinchonidine

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* $$\alpha_D = \frac{\alpha_D lp}{v} = \frac{157{\cdot}4 \times 2 \times 0{\cdot}436}{20} = -6{\cdot}86°.$$

† $$\alpha_D = \frac{\alpha_D lp}{v} = \frac{118{\cdot}7 \times 2 \times 0{\cdot}436}{20} = -5{\cdot}17°.$$

‡ $$\alpha_D = -\frac{\alpha_D l\ 0{\cdot}99 \times 0{\cdot}436}{v} + \frac{\alpha'_D l\ 0{\cdot}01 \times 0{\cdot}436}{v}$$

$$\alpha_D = -\frac{0{\cdot}4316 \times 2 \times 1{\cdot}574}{20} + \frac{0{\cdot}0044 \times 2 \times 211{\cdot}5}{20}$$

$$\alpha_D = -6{\cdot}793 + 0{\cdot}092 = -6{\cdot}701°.$$

sulphate.* In this manner, quinine sulphate containing an admixture of 10·5 per cent. quinidine sulphate would produce a deviation of 5·17, that is to say a deviation precisely equal to that produced by pure cinchonidine sulphate.†

I have here supposed that an alcoholic solution is operated upon, because the memoir of M. Oudemans furnishes directly the data necessary for the calculation of this particular case; but in principle there is no difference when the salt is dissolved in water by the aid of sulphuric acid. The delicacy is, however, a little greater, and the error a little less in the latter case, the relations between the specific rotatory powers of the three acid salts being a little less unfavourable than those obtaining between the neutral salts. Now, for example, when a deviation of −12·13 is observed for pure quinine sulphate, the presence of two per cent. quinidine sulphate in the quinine salt would suffice to reduce the deviation to −11·60, while to produce the same result it would be necessary that the quantity of cinchonidine sulphate mixed with the quinine salt should amount to 11·8 per cent.

Thus then with the alcoholic solution quinine sulphate containing only ten hundredths of impurity might be mistaken for pure cinchonidine sulphate, and with the acidulated aqueous solution the possible error would vary from one to six times as much. This consideration of the case will make it unnecessary to refer to other sources of error.

Before concluding I will add another remark.

It is by design that I have made use of the term tolerance in treating of this subject. If it could be maintained that the presence of a few hundredths of the alkaloids allied to quinine would be incapable of causing any real prejudice to patients, if certain manufacturers pretend that the elimination of these last traces of impurity presents difficulties for them, if various reasons induce us to allow for the present a certain latitude to the manufacturer, it is nevertheless incontestable that there is here only a ques- of tolerance to be dealt with; the pure quinine sulphate is the official article, the normal article, the imperfectly purified salt being nothing more than a make-shift.‡ The conversion of the impure salt into a pure salt represents nothing more than a small difference in the intrinsic value; the pharmacist really solicitous for the quality of the products he supplies will therefore act wisely in repudiating any kind of tolerance, and demanding from the manufacturer to be supplied with an absolutely pure salt. This is easily to be characterized according to what has already been stated above;§ its special crystallization in a dense form is moreover a primary feature which has maintained up to the present its value, and to which pharmacists should adhere.

I am well aware that it is usual to attach to the light sulphate particular qualities, the value of which I do not remember. Certain makers have even found themselves constrained lately to give the pure salt this light form, and they have succeeded in doing so. The commercial interest attaching to their success in this respect ought to be a real one, since they congratulate themselves upon it; but I do not perceive any advantage that pharmacists would derive from the circumstance that an article which they sell in a state of purity should receive the appearance of the same article in an impure condition.

* $6{\cdot}701 = \frac{(6{\cdot}436-x)2\times157{\cdot}4}{20} + \frac{x\times2\times118{\cdot}7}{20}$ whence the weight of the cinchonidine salt $x=0{\cdot}04$ or 9·17 per cent. of the mixture.

† $(100-x)157{\cdot}4 + 211{\cdot}5x = 118{\cdot}57\times100$; whence $x=10{\cdot}5$.

‡ "The official quinine sulphate should not contain any of the other cinchona alkaloids."—Codex, 1884, p. 299.

§ Kerner's test modified applied at 100° C.; 5 c.c. of the solution at 15° C. being rendered clear by less than 6 c.c. of ammonia (0·96 specific gravity), the other characters named in the Codex; maximum rotatory power to the left, etc.

DRUGS AND DIGESTION.*

BY ROBERT G. ECCLES, M.D.

We smile at the incongruous prescriptions of last century, and wonder how either physicians or patients derived any satisfaction or benefit from them. We sneer at the young graduate who, in the confusion that arises from his new evironment, writes orders for gross chemical or physiological incompatibles, and goes from his office pondering upon the degeneracy of medical education. We never stop to question the wisdom of ourselves and others pouring into the stomachs of the sick in the most promiscuous manner, without regard to time or circumstances, drugs that inhibit or check the production of life and health giving peptone. In all chronic diseases the paramount consideration of every scientific medical man regards the patient's nutrition. Where we cannot destroy pathogenic micro-organisms outright, the patient's only hope in the struggle for life lies in the strength of his cells and their consequent power to triumph over their foes. High above every other consideration at such times is digestion. To interfere with or check it in the least, in many cases, is, then, criminal. When our remedies are incompatible with the gastric juice, the time of taking is likely to be of far more importance than the medicine itself. To weaken our patients by the production of artificial malnutrition gives their merciless diseases the advantage over them, where a little more knowledge would have enabled us to aid the vital forces instead of handicapping them. Important, however, as is the knowledge of the effects of drugs upon digestion, it has until the present year (1886) been almost totally neglected. Even in the administration of artificial ferments as aids to digestion the utmost recklessness prevails. Articles utterly valueless, with some of doubtful value, are on the strength of advertisements and samples used to the detriment of the sick. Prescriptions have been shown your essayist in various pharmacies in this city and New York, for the compounding of which large prices were paid. The ingredients were the very best in the country, but the doctor's ignorance had rendered them totally worthless. First-class pepsin, 1 grain of which would digest 1000 grains of albumen in an hour, was in one case compounded with ingredients that rendered it utterly inert, and on actual trial of a repetition of the same it was found unable to digest a single grain in the same time. This physician probably condemned the pepsin for the bad results, as so many others under similar circumstances have done before and since.

Had such prescriptions been written by quacks or unknown practitioners it would not have been a matter for grave comment. Being the work of men who stand high in the profession it necessarily wore a more serious aspect.

Your essayist does not for a moment presume to think that laboratory experiments with flasks, bottles or test-tubes can give exact physiological results. There are cases in which we know that the outcome of the internal use of certain drugs is apparently the very opposite of what might be expected, reasoning exclusively from such data. Let the stomach be the seat of acetic or any other pathological fermentation, and the administration of powerful pepsin inhibitors, in not too large doses, will

* Read before the Brooklyn Pathological Society, Nov. 11, 1886. From the *New York Medical Journal*.

positively aid and hasten digestion. They exhaust their power in destroying a vicious ferment, and thus enable the otherwise inactive gastric juice to assume its function. Any alkali, alkaline carbonate, corrosive sublimate, carbolic acid, creasote, salicylic acid or other powerful antagonist of pepsin will here swing in as an apparent support of Hahnemann's dogma of similars curing similars. As we perceive the causes underlying such seeming contradictions, if we do not rest content with the groundless assumption that the stomach acts in some mysterious non-physical, non-chemical manner, we shall become masters of the situation. Its laws and those of the laboratory are the same, so far as they go together. Our reasoning is at fault when we fail to note the vastly greater complexity involving the one than the other. Whatever inhibits peptonization in the flask will do the same in the stomach, however much other things may mask it or seem even to give reverse results. The lost power has only led to some unforeseen balancing gain. If we continue to wage war on the stomach's store of pepsin because we blundered into what proved a benefit at one or even two trials we shall find that we are deceiving ourselves and damaging our patients. To give pepsin inhibitors when all has been gained that can be by compensation, or when no such compensation is possible, can lead only to ill. And yet this is being done daily and hourly in every civilized community upon the globe.

The study of the retarding effects of drugs upon digestion was first earnestly entered into by Doctor Klikovich, a Russian. The only brief notice of his work English-speaking people have had was given in the London *Lancet* on June 19, 1886. The work embodied in this paper was begun in April (1886), of the present year. On September 4, the *Lancet* again informed its readers that O. Peterson, of St. Petersburg, had published the results of a similar investigation. These brief notices constitute all that is known upon the matter outside the Czar's dominions. The few drugs mentioned show in their results the bad effects of using dried albumen instead of fresh, and the effects of too large quantities of pepsin. Differences which to them seem to have been inappreciable, and that at the commencement of this work were thought impossible of procurement, have by experience been gained. Plan after plan was tried until the best was discovered. Many of the results were tested by from one to six repeated trials. All would have been so tested if another year could have been devoted to the work. Errors will creep in in spite of the utmost vigilance. For the first three months all the experiments were performed at a temperature of 38° to 40° C. (98° to 100° F.), but for the purpose of saving time and expense and getting closer results 49° C. was used. More than half of the old work was confirmed at the new temperature, so that they mutually proved each other. This was a compromise figure between the temperature of the stomach, 40° C., and that found in practice to be the quickest for artificial digestion, 55° C. When 5 grains of albumen were digested with $\frac{1}{10}$ of 1 per cent. of hydrochloric acid in water for one hour, using the same amount of pepsin each time, the following were the amounts undissolved at the temperatures given :—

Degree Centigrade	40°	44°	49°	55°	60°	66°
Albumen undissolved	0·30	0 26	0·20	0·14	0·18	0 36

Other per cents of acid were tried with corresponding results. A glance at the figures shows 55° C. to have the least undissolved albumen left. It would appear from this that the failure of appetite in a patient is not due to the checking of digestion by fever. The products of such digestion, however, no doubt seriously affect the same. There are many kinds of peptone produced in peptic digestion. One of these, called by Meissner "parapeptone" (Reichert's 'Foster's Physiology,' p. 965), is insoluble in neutral solutions. This is the one most abundantly produced at the higher temperature. Once formed its further change into true peptone is impossible without the aid of trypsin. Could it be precipitated in the stomach it would do no harm, since it would be carried through the pyloric orifice into the duodenum, there to complete its metabolism. Not being so precipitated, it finds in the stomach walls a line of neutrality between the alkaline blood and the acid gastric juice, where it can be thrown down to check all osmosis. Like the dog in the manger, it would not form blood itself nor let that do so which could; consequently the patient must suffer. In cases where the fever does not produce such results the doctor is kind enough to order it done on the advice of some advertising quack who patronizes his favourite medical journal. Artificially produced peptones of beef, eggs or milk, prepared at all sorts of temperatures, are poured down the sick man's throat. It is in vain for him to proclaim that his stomach rebels, and that he abhors the stuff—down it must go. It is in vain for him to say that his appetite is worse after it. That is reasoned away as due to the disease, or to his having derived so much benefit from a former dose. There are peptones and peptones, and the quicker medical men know it the better. In all our digestion of albumen there would be a considerable amount of parapeptone produced but for the chloride of sodium taken with our food. During these experiments it was found that peptones produced in the presence of table salt could not be precipitated by neutralization. This was an important discovery, and showed that the use of this article in our food has hitherto been partly misapprehended. To make alkali and acid for peptic and tryptic digestion it would have been as available, and it would seem even much more available, to take it with the water we drink. But we do not relish drinking salt water as we do eating salt meat or salt bread and butter. Wherever we relish salt, there without it parapeptone would be produced to block digestion. Wherever we do not relish it, there it could not avail in that direction. But salt delays digestion, so that an excess must be guarded against as injurious. When the amount of pepsin is made so small that it will require three hours and a half to digest the albumen used, the presence of $\frac{1}{5}$ of 1 per cent. of table salt in the total digestive fluid will delay it to double the time; $\frac{4}{5}$ of 1 per cent. under the same conditions delay to seventeen hours.

Early in this investigation it was deemed advisable to determine whether acids other than lactic and hydrochloric could be used with pepsin to produce peptone. The generally accepted theory being that digestion is a hydrolytic change of the proteids, we should expect to find many other acids capable of producing this result. The following were tried in the varying percentages marked in the first line of the table. The figures opposite the names of the acids represent the amount of albumen remaining undissolved at the end of the trial. The two that were not tried at every strength with the others were considered too doubtful to spend the time upon.

P.c. of acid.	1	0·8	0·6	0·5	0·3	0·1	0·1
	Grms.	Grms.	Grms.	Grms.	Grms.	Grms.	Grms.
Hydrochloric .	0·80	0·55	0·17	0·10	0·00	0 00	0 30
Phosphoric .	0·00	0·05	0·12	0·26	0·71	0·93	2·36
Nitro-muriatic	2·10	1·34	0·31	0·20	0 00	0·21	3·91
Lactic . . .	0·35	1·31	1·89	2·16	3·19	3·90	4·15
Tartaric . . .	0·39	1·29	1·82	1·96	3·08	3·75	3·93
Hydrobromic .	2·96	2·84	2 24	1·48	0 41	0·16	0·39
Nitric . . .	2·27	1·93	1·57	1·41	0 60	0·71	1·89
Citric . . .	1·47	2·22	2·50	2·71	3·73	3·92	4 06
Sulphuric . .	2·31	2·87	2 98	3·16	3·27	3·34	3·74
Hypochloric .	2·65	—	—	3·17	4·79	5·00	—
Acetic . . .	5·00	4·60	3·52	3·19	2·93	3·04	3·11
Hydrocyanic .	--	—	5·00	5·00	4·87	4·01	—

Hydrochloric acid was afterwards tried with a reduced quantity of pepsin, and found to be most efficient at 0·2 per cent. It takes five times as much phosphoric acid to produce the same result as this small quantity of muriatic, while an increased or decreased quantity of muriatic only hinders. A small amount of phosphoric acid added to 0 2 muriatic improves digestion. This is the secret of

acid phosphate becoming so popular, and of the efficiency of dilute phosphoric acid in dyspepsia. This, however, is not true of other acids, nor of this one above 1 per cent. or below ½ of 1 per cent. The next table gives a list of the acids tried. Here digestion was completed in all, and time made the gauge instead of the amount of undissolved albumen. Fifteen cg. of absolute acid or its equivalent of dilute acid were added to the 50 grams of solution. The first nine failed to come out in ten hours :—

	h.	m.		h.	m.
1. Chromic acid	over 10	0	12. Chrysophanic acid	3	40
2. Picric acid	over 10	0	13. Tannic acid	3	0
3. Molybdic acid	over 10		14. Benzoic acid	2	40
4. Sulphuric acid	over 10	0	15. Oxalic acid	2	40
5. Thymic acid	over 10	0	16. Citric acid	2	40
6. Hydrobrom.	over 10	0	17. Tartaric acid	2	30
7. Salicylic acid	over 10	0	18. Oleic acid	2	20
8. Pyrogallic a.	over 10	0	19. Boric acid	2	15
9. Nitric acid	over 10	0	20. Acetic acid	2	15
10. Hypochloric a.	3	40	21. Lactic acid	2	15
11. Cathartinic acid	3	40	22. Phosphoric acid	2	0
			23. Arsenious acid	2	0
			24. Gallic acid.	2	0

The test experiment in this set was over in two hours, so that the last three caused no delay. The last two owe their non-interference in all likelihood to their insolubility. They were practically absent. Benzoic acid did not inhibit as much as it was expected to, for reasons to be mentioned further on. The nine that caused a delay of over ten hours were tried again after reducing to one-third the former strength. This made them 1 part in 1000 of the solution. The next table gives the new results with the 5 cg. The test time was again two hours :

	h.	m.		h.	m.
1. Chromic acid	over 10	0	6. Hydrobromic a.	3	50
2. Picric acid	over 10	0	7. Salicylic acid	3	20
3. Molybdic acid	over 10	0	8. Nitric acid	3	20
4. Thymic acid.	7	40	9. Carbolic acid	3	10
5. Sulphuric acid	5	10	10. Pyrogallic acid	2	5

As three again went over ten hours, at the next trial they were reduced again, 1 cg. only being used, or 1 part in 5000. The test time by increasing the pepsin double was reduced to one hour. Chromic acid came out in four hours and forty minutes, picric in four hours and a half and molybdic about the same. To make their efforts non-appreciable would require their dilution to not less than 1 part in 40,000. Picric acid in contact with ground albumen over-night causes a very marked shrinkage in the volume, so that it appears as if the larger bulk of it had been digested without pepsin. The following alkaloids and their salts were next tried. The test time was again two hours. Three parts in 1000 were used, or 15 cg. in 50 grams. The first on the list, ferrocyanide of quinine, was completely decomposed at the expense of the acid, and, although 0·4 per cent., or double the usual quantity, was used, its long delay was probably due to this. At the end of the experiment considerable Prussian blue had taken the place of the now dissolved chloride of quinine :—

Alkaloids and their Salts.

	h.	m.
1. Ferrocyanide of quinine	5	30
2. Citrate of iron and strychnine	5	20
3. Citrate of iron and quinine	5	10
4. Sulphate of cinchonidine	4	30
5. Sulphate of cinchonine	4	20
6. Sulphate of quinidine	4	20
7. Sulphate of quinine	4	10
8. Bisulphate of quinine	4	0
9. Sulphate of strychnine	4	0
10. Sulphate of morphine	3	40
11. Tannate of quinine	3	20
12. Salicylate of quinine	3	20
13. Salicylate of cinchonidine	3	10
14. Chloride of quinine	3	5
15. Bromide of quinine	3	0
16. Sulphate of atropine	3	0
17. Hydrochloride of cocaine	2	50
18. Chloride of morphine	2	45
19. Bromide of caffeine	2	40
20. Veratrine	2	40
21. Strychnine	2	30
22. Aconitine	2	20
23. Brucine	2	20
24. Morphine	2	15
25. Acetate of strychnine	2	15
26. Chloride of pilocarpine	2	15
27. Acetate of morphine	2	5
28. Codeine	2	0

The last one, coming out evenly with the test, showed that its presence had not retarded any. It was again tried in double the proportion—*i.e.*, 3 cg. in 50 grams. This time it did not come out for two hours and forty minutes.

In testing the essential oils found in the next table, 15 cg. were first dissolved in 2 grams of alcohol and then added to the digesting fluid. Besides the usual control containing no drug, an extra one was added containing the same amount of alcohol as was used to dissolve the oil. This came out in two hours and ten minutes. The delay time of 2 grams of alcohol was therefore ten minutes.

Essential Oils.

	h.	m.		h.	m.
1. Cinnamon	over 10	0	22. Wormwood	3	10
2. Pimento	over 10	0	23. Erigeron.	3	10
3. Lemon grass	over 10	0	24. Cajeput	3	10
4. Bitter almond	over 10	0	25. Rosemary	3	10
5. Clove	9	50	26. Nutmeg	3	0
6. Bay	8	40	27. Rose geranium	3	0
7. Bergamot	8	40	28. Orange	3	0
8. Sassafras	8	20	29. Lemon	2	55
9. Wintergreen	5	10	30. Wine (ethereal)	2	50
10. Rose	4	50	31. Amber	2	50
11. Origanum	4	20	32. Neroli (petal)	2	50
12. Citronella	3	30	33. Black pepper	2	50
13. Caraway	3	20	34. Juniper	2	40
14. Coriander	3	20	35. Savin	2	40
15. Spearmint	3	15	36. Cedar	2	40
16. Pennyroyal	3	15	37. Patchouli	2	40
17. Aniseed	3	15	38. Croton	2	20
18. Fennel	3	15	39. Sandalwood	2	10
19. Lavender	3	10	40. Cubeb	2	10
20. Peppermint	3	10	41. Turpentine	2	10
21. Thyme	3	10			

The first four were again tried with one-third the amount of essential oil. Bitter almond then came out in three hours, and the others in five hours. A glance over the table shows that essential oils of similar origin, or derived from the same natural orders of plants, produce as a rule results very nearly alike. This is exemplified by the labiates spearmint, pennyroyal, lavender, peppermint and thyme. The close relationship of cedar, savin and juniper, and also of fennel, coriander and caraway, tells the same story for the families to which they belong. It is also somewhat singular to find the three oils of sandalwood, cubeb and turpentine as closely related here as they are in their physiological indications, although belonging to quite remote orders. Four balsams were, like the essential oils, dissolved in 2 grams of alcohol, and then added to the digestive fluid with the following results. The Canada balsam dissolved very imperfectly, so that its result is probably short of the true figure :—

Balsams.

	h.	m.		h.	m.
1. Tolu	5	30	3. Canada	2	55
2. Peru	4	20	4. Copaiba	2	40

(*To be continued.*)

GAMBOGE OF BURMAH.*

BY R. A. MACK,

Agricultural Department, Rangoon.

Although various varieties of gamboge-bearing trees have for many years past been known to exist in different parts of the province, notably in the Tenasserim division, it was not until comparatively recently that the subject was brought specially under the notice of the local Government. Writing more than thirty years ago, Mr. Simmonds, in his work entitled 'Commercial Products of the Vegetable Kingdom,' says: "The *Garcinia elliptica* of Tavoy and Moulmein affords gamboge and approaches very closely in its character to Graham's *Hebrodendron;*" and he adds that it affords "a fine pigment." Dr. Mason also, in his work on Burmah, remarks that "the best gamboge is produced by *Garcinia elliptica*, but an inferior article is produced by *G. cornea*, *G. anomala*, *G. cowa*, *G. kydia*, *G. succifolia*, *G. xanthochymus*, and *G.* (*Hebrodendron*) *morella*. *Garcinia Cambogia* yields a pleasant fruit and a gamboge quite insoluble in water, and it is the complete solubility of the best gamboge that distinguishes it from inferior sorts, but it is probable that, when fully investigated, these insoluble gamboges will be found of service in the arts."

In 1875 Mr. Wittall, of the Forest Department, drew attention to three different species of trees, belonging to the genus *Garcinia*, growing in the districts of southern Tenasserim. These were known to the natives as *Tawmengoot*, *Parawah*, and *Parajay*. The two last named Mr. Wittall did not consider of much account. The *Parawah* yields an exudation of a white colour, which changes to a reddish yellow on exposure to the atmosphere, and is scarcely at all soluble in water, but yields to alcohol. The *Parajay* yields a rather copious exudation which when dissolved in spirit of turpentine affords a beautiful permanent yellow varnish for metallic surfaces, and on this account has been called the gamboge tree as well as the yellow varnish tree; but its exudation does not form an emulsion with water, and, for this and other reasons, Mr. Wittall considered it had no claim to be considered a real gamboge tree. The *Tawmengoot* was, in Mr. Wittall's opinion, the gamboge tree of the south Tenasserim forests. He says, "The gum resin is larger in quantity and darker and of a more glossy colour than the others: neither wet nor dry is it so sticky, and so readily does it form an emulsion with water that the exudation on the outer bark is completely washed away by the rains." This tree he believed to be the same as that which Dr. Mason calls *Thanataw* (*Garcinia elliptica*) [*G. heterandra*], and he adds that it was supposed to be the same as that which yields the gum resin exported from Siam. But Mr. Hill, Officiating Conservator of Forests, Pegu Circle, thinks the *Tawmengoot* is probably the *G. morella* or *pictoria*, or *gutta*, the true gamboge tree, which does not grow all over Burmah like *G. elliptica*, or *G. cowa*, which latter are common trees throughout the province.

In May, 1884, the Commissioner of Tenasserim drew the attention of District Officers to the trees called *Thaungthaleh* (*C. kydia*) and *Thanataw* (*G. elliptica*) found growing in the tropical forests of Martaban and Tenasserim with the view, if possible, of developing a new industry for the people. Of the former Mr. Hill says: "It yields a yellow substance of a bright colour, but paler than the gamboge of Siam. It is scarcely soluble in water, but dissolves in spirits of turpentine and affords a beautiful, permanent, yellow varnish for metallic surfaces. As the substance is very resinous and will not dissolve in water, it is valueless as a pigment." Of the latter he remarks: "The product known as *Thanataw* is obtained from *G. elliptica* or *heterandra*. It is called a superior gamboge, but in all probability merits the name almost as little as *Thaungthaleh* owing to its only partial solubility in water. It is found throughout the province and is darker in colour than *Thaungthaleh*." A sample of *Thanataw* obtained from Tavoy was found upon analysis to contain:—

Resin	76·5
Gum	23·5

This sample was sent to Calcutta for valuation, where it was declared to be gamboge, but unsalable in an unrefined state. In August of the same year samples of gum produced from two other kinds of trees called *Palagyi* and *Tawmengoot* were also obtained and submitted for analysis. They were found to contain:—

	Palagyi.	Tawmengoot.
Resin	58·82	53·20
Gum	9·54	20·30
Water	32·66	25 60

In his report on these samples Dr. Romanis, the Chemical Examiner, says the yellow kind (*Tawmengoot*), makes a very fair paint, but the other is of no use. If the gum is extracted it makes a spirit varnish, but when warm it melts and gets sticky.

According to the broker's report, to whom the sample of *Thanataw* referred to above was submitted for valuation, gamboge in its refined state sells in the Calcutta Market at from R2 to R2-8 per seer. It arrives there freely from June to August, usually packed in cases of from three to four maunds, and it is chiefly used in French polish and paint. In Burmah the cost of collection alone is estimated by the Deputy Commissioner, Tavoy, at R25 per viss (3·65 lbs.) That is to say, the cost of collection amounts to nearly R7 per lb., while the market value of the product is only R 1·4 per lb., and that too when it is in a refined state. It does not appear why the cost of collection is so great. In Ceylon the process of collection is very simple. There the gamboge is usually collected by cutting a thin slice of the bark of the tree here and there of the size of the palm of the hand. On the flat space thus exposed the gum collects and is scraped off when sufficiently dried. It may be possible perhaps to reduce the cost of collection. Unless it can be reduced very considerably, we cannot hope to introduce the Burmah product into the market. From the inquiries made, then, it would appear that the *Tawmengoot* alone yields good gamboge, and that the only obstacle in the way of the gamboge succeeding as a commercial product is the high cost of collecting it. The products of the other trees mentioned are not promising, because of their comparative insolubility in water.

* From the *Indian Forester*. Reprinted from the *Tropical Agriculturist*, October.

FORMATION OF OLEATES DURING THE PREPARATION OF OINTMENTS.*

BY CHARLES T. GEORGE.

I have long suspected that oleates were formed in the preparation of ointments made with lard or simple cerate, and containing metals or the metallic oxides, and, therefore, always opposed the indiscriminate use of the various petroleum compounds for the making of ointments.

In order to convince myself of the facts, I made experiments with following ointments:—

Mercurial ointment, 50 per cent.
Red oxide of mercury ointment.
Yellow oxide of mercury ointment.
Oxide of zinc ointment.
Nitrate of mercury ointment.
Nutgall ointment.

* From the 'Proceedings of the Pennsylvania Pharmaceutical Association,' 1886.

These ointments I prepared with petrolatum, and according to the United States Pharmacopœia. I made solutions of all the ointments in sulphuric ether, turpentine, and petroleum benzin, as follows :—

Mercurial ointment, 50 per cent., 240 grains.

Petroleum benzin, 2 fluid ounces.

Dissolve and filter, whilst yet warm, evaporate the filtrate until the benzin has almost disappeared, dissolve the remainder in hot alcohol, one and one half fluid ounces, and chloroform, one half fluid ounce, place on ice until the stearic acid separates, and filter. Evaporate the filtrate until the alcohol and chloroform have entirely disappeared. The remainder, resembling the colour and thickness of castor oil, is of necessity an impure oleate of mercury.

The investigation was carried no further, as to the quantity of oleate present or its strength, only as to the loss of mercury, which must be contained in the solution, and as to the fact that it was really present, which can be readily ascertained by taking a bright piece of copper, or a copper penny will do, and covering the surface with a few drops of the liquid, and gradually heating the copper over a spirit lamp, when the mercury is quickly reduced to its metallic form and adheres to the copper surface. The loss of mercury, originally in the ointment, was ascertained by washing the first filter well with benzine and drying, and then to ascertain the weight of the mercury contained therein, which amounted to 80 grains, showing a loss of 40 grains of mercury, which must necessarily be contained in the oleate.

In this manner all the mercurial ointments, made according to the United States Pharmacopœia, were tried, and gave the following results, based on the examination of 240 grains of ointment each :—

Mercurial ointment, 50 per cent., loss 40 grains.

Red oxide of mercury ointment, loss 8 grains.

Yellow oxide of mercury ointment, loss 10 grains.

The examination of the nitrate of mercury was difficult and unsatisfactory, but the resulting oleate proved to contain mercury in perceptible quantity with copper test, as well as with the saponification with caustic soda solution. which precipitated the mercury in a finely divided blue powder. The last was also applied to the other three ointments named above with the same result.

On the other hand, ointments made with petrolatum of the same strength as the others, the metallic mercury as well as the oleates thereof, were all recovered with very small loss, and that, probably, owing to the manipulation, by dissolving the ointments in turpentine, benzin and sulphuric ether, filtering, washing the filter well, and drying, then weighing the tared filter and its contents.

My object in examining the ointment of nut galls was to ascertain whether any of the properties of the galls would be extracted either by the lard or petrolatum. Of course, in making this examination I tried only two methods—the benzin and turpentine solutions.

The resulting solution, made from ointment, according the United States Pharmacopœia, became inky when shaken with a solution of chloride of iron, and violet when shaken with solution caustic potassa.

Whilst the solution of the ointment, made with petrolatum, and treated in the same manner, showed no trace of gallic acid whatever, is evidence that the use of lard, or lard oil and tallows are to be recommended for the preparation of all ointments containing metals or their oxides, or vegetable powders, or extracts of any kind. Petrolatum as a base is to be only recommended for the preparation of such ointments as are used for the purpose of protecting an abraded surface of the skin, or a hacked or chapped or chafed surface, acting rather in a mechanical manner than for any medicinal virtues they may contain.

I feel sorry that I must come to this conclusion, as it would be a very desirable thing to possess a base for ointments that has the desirable feature of permanence, and not likely to become rancid. In treating upon this subject we must bear in mind that lard and suets contain free fatty acids—suets from 2 to 8 per cent., lard from 8 to 15 per cent., which can easily be determined by the following rule :—

Make tincture of turmeric as follows :—

One ounce turmeric, 4 fluid ounces of alcohol, percolate, add sufficient alcohol to make percolate measure 4 fluid ounces.

Solution of potassa, having a specific gravity of 1·005, sufficient quantity.

Melt the lard or tallow in a suitable vessel and add 10 c.c. of it to 2 fluid ounces of alcohol contained in a glass bottle holding about 4 ounces, and shake well, then add 1 c.c. of tincture of turmeric and shake. Now add gradually, from a graduated pipette, the solution of potassa, shaking from time to time until the saturating point is reached, note how many c.c. were required for saturating the fat, and divide the number by two, which will give the percentage of free fatty acids.

Upon this may depend the larger or smaller quantity of oleates formed in the various ointments mentioned.

This I have not yet determined—whether the formation of an oleate in a mercurial ointment is dependent on the free acid already present, or whether it is formed by a slow or gradual decomposition, and, therefore, whether it is best to use lard or fat of any kind containing the free acid, or whether it should be first deprived of the free acids, which can be easily accomplished by washing with alcohol and a weak solution of bicarbonate of sodium.

All these are thoughts for future investigation, which I did not have the time to pursue to my satisfaction, but which I propose to continue during the present year.

BACTERIA IN DRINKING WATER.

Mr. Meade Bolton has contributed an important paper on this subject to Koch and Pflüger's *Zeitschrift für Hygiene*. He finds that in ordinary spring water certain bacteria are always present and are capable of multiplying in it. Among these may be specially mentioned *Micrococcus aquatilis*, occurring as cocci collected into small irregular heaps, and *Bacillus erythrosporus*, distinguished by its spores having a reddish-brown sheen, and the presence of a greenish pigment without any deliquescence of the gelatine in which it was cultivated. Both these bacteria multiply with extraordinary rapidity in water, the quality of the water and the amount of organic and inorganic substances contained in it appearing to have no effect on the reproduction of the microbe, which is, however, materially promoted by a rise of temperature. It took place considerably quicker at 35° than at 20°. These bacteria are not pathogenic.

On the other hand, the author found that pathogenic bacteria, when introduced into spring water, never multiply, but disappear after a time varying in length according to the species and the temperature, and according as to whether the species produces resting-spores or not. The spores of *Bacillus anthracis* had not lost their vitality in a year and a day; those of typhus fever were still active after a month but not after ten and a-half months. The quality of the water appears to have no influence in prolonging the life of pathogenic bacteria.

The general conclusions drawn by the author are that the quantity of bacteria present in spring water is no guide whatever in determining the wholesomeness or otherwise of the water for drinking purposes, since they are most entirely harmless, and that it is impossible by chemical analysis to determine the presence of bacteria in larger or smaller numbers. The presence of the specific pathogenic bacteria can only be determined by direct microchemical observation.

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ARE TRADE STANDARDS FOR MEDICINAL PREPARATIONS DESIRABLE?

THE proceedings at the special general meeting of the Sheffield Pharmaceutical and Chemical Society, which took place on the 12th inst., and were reported in this Journal last week, raise some questions of some considerable importance in regard to the position that should be maintained by pharmacists as to the quality of the drugs and medicinal preparations supplied by them, and the relation they should hold to other vendors of analogous articles. The view expressed in the latter portion of the first resolution, to the effect that the British Pharmacopœia is the standard by which pharmacists should consider themselves to be bound in the preparation of medicinal articles, is one with which we cordially agree as being the only one consistent with such a due regard for their professional functions as can be relied upon by them for maintaining a position of superiority in relation to other classes of traders. But we are not by any means equally disposed to agree with the other proposition conveying the idea that the British Pharmacopœia should be made the legal standard applicable to all cases, and upheld in relation to traders who do not belong to the pharmaceutical body. The sentiment by which this proposition has been suggested is no doubt good and laudable, but we think its application is a mistaken one. In any case it has received a rude rebuff at the hands of the stipendiary magistrate before whom the cases of prosecution under the Food and Drugs Act were heard lately at Sheffield, and he has held that, as a case in point, any preparation containing any opium and any alcohol whatever may be legally sold as tincture of opium. This decision is evidently inspired by the spirit of free trade that has probably taken too firm a hold of public opinion nowadays to be combated directly. The magistrate in these cases refused to accept the British Pharmacopœia as an authority for the regulation of ordinary transactions of trade, and we cannot think that he was altogether in the wrong in doing so, though the form in which he expressed his views was perhaps a somewhat exaggerated one. It is no doubt extremely unpleasant for pharmacists to find themselves forced into an apparent competition with other classes of traders who supply articles nominally of the same kind as they do, and hold themselves out to the public as the purveyors of drugs and medicinal preparations. Such unprofessional competition has nowadays to be tolerated by other classes as well as pharmacists. We do not believe that a remedy is to be sought for this evil by legislation or by restrictive regulations of trade of any kind. The general public is now the arbiter as to the source from which supplies of any description are to be procured, and the recommendation of any one in particular must be furnished by the public appreciation of the advantage to be secured by having recourse to it. Applying these views to pharmacists, we think it highly commendable that they should most stringently conform to the guidance of the British Pharmacopœia in respect to all the drugs and medicinal preparations they have to do with, not out of fear of the law, but from a professional regard for their responsibilities and with the motive of maintaining their professional credit. It should not be a matter of any importance to them what the oilman, or the grocer, or the stores might sell under the name of any medicinal preparations, but they should seek to establish such a repute with the public for the quality of their drugs and preparations as to command custom by reason of the confidence felt that the articles purchased of them could be relied upon because they were supplied by a pharmacist.

It is from this point of view that we are inclined to think that the excitement which has been created at Sheffield by the decisions of the stipendiary magistrate has gone a little beyond the mark. If the public can be induced to think that at a pharmacist's articles of unquestionable quality are sure to be obtained, while at establishments of a different order there can be no such certainty, the best and only really trustworthy protection of pharmaceutical interests will have been established and a great advance made towards the repression of unprofessional competition. It is to the attainment of this end that the efforts of the Pharmaceutical Society as a body have always been directed, and if they had been more generally supported in this direction by the members of the class that would thus be benefited much greater progress might have been made towards a better state of things. Among the arguments put forward in the resolutions passed at the Sheffield meeting that which relates to the possible danger accruing to the public from the sale of medicinal preparations having the name of preparations in the British Pharmacopœia, but differing more or less from them, is, in our opinion, scarcely one that can well be urged by pharmacists for the purpose of making the British Pharmacopœia the sole legal standard regulating trade in such articles. Nor do we think it is expedient that they should take this position and seek to establish such a compulsory standard for all persons. The public is entitled to exercise a choice as to what it will purchase,

and where it will obtain even medicinal preparations. The protection of the public safety as a general duty is not the particular province of the pharmacist, but of the Government. It is, however, quite within the province of the pharmacist to uphold the character of his preparations, and by every means in his power to impress upon the public the fact that if standard and correct medicinal preparations are required, his is the establishment where they may be obtained. We doubt very much whether the Order in Council referred to in one of the resolutions has really any binding application at all, even to pharmacists. It would appear to be altogether obsolete, and merely of historical interest. Nor do we think there is, or should be, any occasion for such an influence. For the conformity with the prescriptions of the Pharmacopœia which the pharmacist observes is instigated by a different motive than that of obedience to the law in order to avoid its penalties. The motive which induces him to observe its directions is regard for the maintenance of his professional character, and it is upon that basis that he should place himself in distinct contrast to other classes of traders with whom he has really nothing in common so far as the exercise of his business is concerned. It is upon that basis alone that he can look for remuneration of his services upon a different scale than that obtaining for the mere trader.

THE TESTING OF QUININE SULPHATE.

In calling the attention of our readers to an article by M. Jungfleisch on the modification of Kerner's test for the purity of quinine sulphate which has been adopted in the French Codex, we do so because of the very intense interest that has been excited in France by the letter lately addressed to the Academy of Medicine in Paris in reference to this subject. The very exaggerated statements then made have since been corrected by M. Jungfleisch, and he has applied himself to the elucidation of the defects of the method of testing ordered in the Codex. As regards the main points of this elucidation, showing that Kerner's original test cannot be relied upon for detecting the presence of cinchonidine in quinine sulphate, and that in order to render it efficacious in that respect it is necessary that the sample to be tested should be heated with water to the boiling point, and in some instances even to dissolve it completely at that temperature, we may mention that they are in precise accord with the demonstrations given before the Pharmaceutical Society of Great Britain at an evening meeting in February, 1877, and published in this Journal at that time. But, notwithstanding this circumstance, the test given in the Codex of 1884 only improved the directions for applying Kerner's test so far as to direct that the tube in which the mixture of quinine sulphate and water is to be shaken should be heated by immersing it in warm water (*eau chaude*). This vague direction has been a prolific source of error and miscarriage, and it is now found to be necessary to make up for the defect by a provisional direction that some particular temperature should be applied in making the test. As M. Jungfleisch points out, the proper temperature to apply in order to obtain trustworthy results is that of boiling water, and we would also suggest that in order to obtain the best possible results the proportion of water used in testing quinine sulphate should be nearly enough for its complete solution at the boiling point, so that the most favourable conditions for the separation of a relatively large quantity of a very sparingly soluble salt from a relatively small quantity of a comparatively very soluble salt may be realized to the fullest extent. We may also add that the substitution of ether as a solvent for the alkaloid remaining in solution when Kerner's test is applied to quinine sulphate was also recommended on the occasion above referred to, and the mode of carrying out the test in this way was described in the *Pharmaceutical Journal* of the 17th of February, 1877, p. 672. It is satisfactory to find that these necessary improvements of this test have at length been recognized and acted upon.

We are glad to be able to report that the Twenty-First Annual Chemists' Ball, which was held at Willis's Rooms on Wednesday evening, passed off with considerable success. The company present numbered about two hundred, an attendance which, if it fell a little below that on some previous similar occasions, was not without some compensating advantages in being well within the capacity of the establishment, and therefore consistent with the general comfort and enjoyment. The toast of the evening, "Success to the Chemists' Ball," was proposed by Mr. Michael Carteighe, President of the Pharmaceutical Society, who presided at the supper, and it was as usual heartily received. All the arrangements were well carried out under the supervision of the Stewards, and Mr. Bowen may well be congratulated upon the result that has attended his first essay as Honorary Secretary to the Chemists' Ball.

* * *

Dr. L. Scholvien, of Berlin, reports that in the examination of [German] chloroform he has repeatedly met with samples that gave a distinct reaction with silver solution, which he now finds to be referable to a contamination with arsenic (*Apot. Zeit.*, Jan. 8, p. 14). The source of the arsenic is somewhat difficult to determine. It would not seem impossible that the action of chloride of lime containing arsenic on the alcohol might give rise to organic arsenical compounds, which would pass over in the distillation; but on the other hand, upon distillation of the defective chloroform the arsenic is concentrated in the residue. It is, of course, also possible that the contamination may have been due to the use in the manufacture of sulphuric acid containing arsenic.

* * *

At a meeting of the Chemists' Assistants' Association to be held on Wednesday next, the 26th inst., a paper on "The Pharmacognosy and Chemistry of Calabar Beans," by Mr. P. MacEwan, will be read.

* * *

We have been requested to say that the course of lectures by Professor Armstrong on the "Chemistry of Nitrogen and its Compounds," to which reference was made last week, will commence on Monday next, the 24th inst., and not on the 27th inst., as has been announced erroneously by advertisement.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

A meeting of the Executive of the North British Branch was held in the Society's House, 36, York Place, Edinburgh, on Wednesday, January 19, at 12 noon.

Present—Messrs. Ainslie, Baildon, Clark, Gilmour, Mackenzie and Noble, Edinburgh; and Messrs. Gibson, Leven; Hardie, Dundee; Kermath, St. Andrews; Kinninmont, Glasgow; Maben, Hawick; Nesbit, Portobello; and Watt, Haddington.

Letters of apology were received from Messrs. Boa and Mackay, Edinburgh; and Messrs. Frazer, Glasgow; Storrar, Kirkaldy; and Strachan, Aberdeen.

On the motion of Mr. Gilmour, the chair was taken by Mr. Watt, Haddington.

The Chairman stated that the first business was the election of a Chairman of the Executive, and he moved that Mr. Baildon be elected to fill the office. This was seconded by Mr. Nesbit, and unanimously agreed to.

Mr. Baildon having taken the chair, it was moved by Mr. Gilmour, seconded by Mr. Mackenzie, and unanimously resolved that Mr. Watt, Haddington, be elected Vice-Chairman.

After discussion, it was unanimously agreed that the resident members of the Executive be appointed a General Purposes Committee, to deal with matters of detail and any business emergency in the interval between meetings of the Executive.

The meeting was then closed.

Provincial Transactions.

NORTH OF ENGLAND PHARMACEUTICAL ASSOCIATION.

A special general meeting of the members of the above Association was held in the rooms, St. Nicholas Chambers, Newcastle-on-Tyne, on Thursday, January 6, at 8 p.m., to discuss a motion referring to the curriculum proposed by the Council of the Pharmaceutical Society. The President, Mr. N. H. Martin, was in the chair.

Letters of apology were read from several members from outlying towns and villages, expressing regret at their inability to be present and their entire approval of the motion as published on the circular calling the meeting.

The President commenced by stating that on receiving the notice calling this meeting it would have occurred to most of the members that it was quite unnecessary for them, as an Association, to discuss this question, because they were already committed to the support of systematic training as an essential preliminary to the examinations of the Pharmaceutical Society. Most of them were aware that when the Association was started the proposed alteration in the Bye-laws of the Society, including the curriculum, had passed the Council and the members of the Pharmaceutical Society, and the Association was indebted to the idea (an erroneous one as events have proved) that the Privy Council would confirm such alteration for the support which it received and for the wonderful success attained during the first year. Unfortunately the Privy Council did not confirm the Bye-laws, and the second year promised to be much less successful, as might have been expected from past experience in this and every other town where attempts had been made to provide systematic education for pharmaceutical students. He need not go over all the ground of the relation of education to examination, or deeply into the reasons why education left entirely to voluntary effort had failed. There was an almost universal consensus of opinion that such was the case, and they found it echoed by such representative bodies as the British Pharmaceutical Conference and the Chemists' Assistants' Association. Most of them would be aware that at the November meeting of the Council of the Pharmaceutical Society Mr. Schacht had proposed that the Law and Parliamentary Committee be requested to draft a Bill to be introduced into Parliament to give the Society the powers with respect to education and examination which it had not got under the present law, and that such motion passed the Council almost unanimously. Seeing that account of what the Society was doing it seemed a desirable thing to bring the question prominently before the members of the Association. There were two courses open. The one was, as an Association to remain quiescent and to let the matter be in the hands of the Council of the Pharmaceutical Society, any individual giving what support he liked to the scheme; the other plan was to pass a resolution which would affirm the conviction of the Association as to the necessity there was for compulsory education. The latter would doubtless be helpful to the Council of the Pharmaceutical Society in its work, and it appeared to him to be the truly logical and consistent course to adopt. He had, therefore, to propose—

> "That no scheme for remedying the defects of the present system of examination in pharmacy can be satisfactory or achieve its object, unless it provides for the compulsory training and education of candidates, under some such conditions as those that have been already laid down by the Council of the Pharmaceutical Society."

Mr. C. B. Ford seconded the motion and said he was sure the members would all agree with the remarks which had been made by the President. If the Bye-laws had been confirmed and there were a prospect that the curriculum would become law at an early date, no one doubted but that an immense impetus would be given to the demand for education.

Mr. Watson and Mr. Wright also supported the motion, the latter referring to the value of systematic and prolonged training as a means of fitting men to perform the responsible duties of the pharmaceutical calling as well as to qualify them for the examination room.

Mr. Clague said he had not paid sufficient attention to the question to be prepared to oppose the motion, but he was sorry he could not see his way clear to support it. It appeared to him the curriculum as proposed by the Council of the Pharmaceutical Society did not sufficiently take into account the earnest and capable apprentice who might make a good use of his time and acquire the knowledge necessary without attending any classes. He thought such young men should not be compelled to submit to the curriculum.

Mr. Adams agreed with the last speaker, but said he would support the motion if any one could guarantee that the Pharmaceutical Society would recognize local schools of pharmacy in carrying out the curriculum.

Mr. Proctor said he came to the meeting to hear the remarks of others and without any intention of contributing to them. He was sorry he could not support the motion, which he considered too vague in its terms. Asked by the President if he had any amendment or counter-proposition to put before the members, he replied that he had not.

The President, in reply to Mr. Clague, stated it was perfectly true that the compulsory clauses would be binding on the good student who might not need it as an incentive to study, but he thought such a young man would be the first to welcome the curriculum. It must be remembered, however, that laws were not made for exceptions or for individuals, but for the good of the whole body, and as it had been proved to demonstration that the voluntary system as applied to the education

and training of young men for the pharmaceutical calling had failed, pharmacists were justified, nay, it was incumbent upon them to seek to place education upon a more satisfactory footing, and this the proposed curriculum would do. In reply to Mr. Adams, he said it was in no sense the fault of the Pharmaceutical Society that the means of educating chemists in the provinces were so deficient; that was due to local indifference to the subject. The President was quite sure, however, that where there was a school of pharmacy properly organized and working under pharmaceutical supervision, which could show that it had the means and was capable of fulfilling the conditions of the curriculum, that school would be recognized. It was entirely a mistake to suppose that the Council of the Pharmaceutical Society thought only of the School at Bloomsbury Square. There was nothing in the whole history of the Society, or which would be found in the utterance of any responsible member of the Council, to warrant such an idea.

The motion was then put to the meeting and carried *nem. con.*

TORQUAY CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting was held on January 11, Mr. T. Ness occupying the chair. The minutes of the last meeting having been read by the Secretary, Mr. W. Smith, and confirmed, Mr. W. Bathe, Vice-President, read an interesting paper on "The Practice and Study of Pharmacy: Past and Present." The subject was treated in a comprehensive manner, commencing with the earliest records of pharmacy and materia medica in the ancient days of Egypt, Arabia, Greece and India, special attention being paid to the old alchemists and their mystical "philosopher's stone;" passing reference was given to the Scripture allusions to pharmacy and medicines, the rise and progress of pharmaceutical and remedial knowledge from its chaotic condition in England in the sixteenth century was traced, the extraordinary character of many of the numerous "Simples and Compounds" then in use and recognized in early Pharmacopœias being noticed. It was shown that England suffers in comparison with France and Germany in regard to the legal recognition of pharmacy; also the interesting fact that the rise and progress of pharmacy sympathized very considerably with the great rise and spread of literature in the Elizabethan era. Allusion was made to the so-called "upstart chemists" of the period (about 1680), who, after severance from the old apothecaries, became the party of progress in pharmaceutical concerns, notwithstanding much opposition. Attention was then directed to the era of modern pharmacy, inaugurated by the founders of the Pharmaceutical Society, special mention being made of Jacob Bell and other "leading lights." In conclusion, a comparison was drawn between the present aspect of pharmacy and that of the remote and nearer past, especially with reference to the latter, showing that the many appliances and requirements of modern pharmacy had rendered its practice far easier than formerly as regards physical labour. Also, that although the professional status of pharmacists had improved, their pecuniary interests had unfortunately not done so. Pharmaceutical study was referred to in various parts of the paper, and towards the close students were forcibly recommended to commence assiduous study early in their career, and to exercise a spirit of individual self-help without depending upon the aids of "crammers" or "courses of study." The paper was interspersed with several humorous allusions and poetical quotations, and manifested a considerable amount of care and research on the part of its author.

A discussion followed, in which Messrs. Ness, Morris, Curtis and others took part.

A vote of thanks to Mr. Bathe terminated the proceedings.

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION OF GREAT BRITAIN.

A special meeting of the Executive Committee of this Association was held on Friday, January 14, 1887, at 12.45 p.m., to consider the extremely critical financial condition of the Association, and to decide on the steps to be taken to place the Association in a sound financial position.

Mr. W. G. Cross (Shrewsbury), President, in the chair.

Present:—Messrs. Barclay (Birmingham), Chapman (Scarborough), Churchill (Birmingham), Harrison (Sunderland), Hart (Manchester), Holdsworth (Birmingham), Jervis (Sheffield), O. Jones (Llanrwst), W. Jones (Birmingham), Parker (Nottingham), and the Solicitor to the Association.

Letters of apology were received from the following members, regretting their inability to attend, viz.:—Messrs. Arblaster (Birmingham), Andrews (London), Bell (Hull), Crook (Eastbourne), Hampson (London), Laird (Edinburgh), Mackenzie (Edinburgh), Paterson (Aberdeen), Symes (Liverpool), and Walker (Nottingham).

The minutes of the previous meeting of the Executive Committee were read and confirmed.

The Chairman said he was sorry to say that it was again his lot to draw their attention to the absence of a familiar figure at that table, he referred to the late Mr. Henry Davis, of Leamington, who for the past two or three years was a representative upon that Committee. They all knew how assiduous he was to his duties, and the intelligent and able manner in which he took part in their discussions. He desired to propose the following resolution:—

> "That this Committee, on behalf of the Association, beg to express their deep regret at the loss they have sustained by the death of Mr. Henry Davis, who was a firm supporter and friend of the Association; they likewise desire to accord their sympathy with his bereaved family."

Mr. Harrison seconded the proposition, remarking that he could endorse all the Chairman had said as to the value of the services rendered to the Association by the deceased gentleman.

The resolution was unanimously carried.

The report of the Sub-Committee appointed by the Law and Parliamentary Committee was then read.

The report stated that the Committee had instructed the Solicitor to advise a member against whom proceedings had been commenced for the alleged sale by his assistant of laudanum when tincture of rhubarb was asked for. That the Assistant Secretary had successfully prosecuted in the Police Court two offenders under the 17th section of the Pharmacy Act, when fines of 5*s.* and 10*s.* were respectively inflicted, and that in each case the Pharmaceutical Society had subsequently obtained a judgment in the County Court for £10 and costs under the 15th section of the Act. That the Committee had ordered the defence of a member, residing at Sheffield, against whom proceedings were commenced under the Sale of Food and Drugs Act for having improperly dispensed a prescription containing citrate of iron and quinine. Professor Attfield had analysed the sealed portion left with the vendor by the inspector and pronounced it to be the compound as ordered in the prescription. The local authorities, however, withdrew the summons, and also another summons down for hearing on the same day, in which ·850 spirit of nitre had been sold.

Mr. Barclay said the Committee had not been able to do as much as they should have liked to have done. That was owing largely to the want of the sinews of war. He begged to move:—

> "That the report of the Sub-Committee now read be received, adopted, and entered on the minutes."

Mr. Jones (Llanrwst) seconded the motion, which was carried unanimously.

The Secretary said that on October 18 last, he had an interview with Mr. Bright at Somerset House on the Patent Medicine Stamp question, and that he left in that gentleman's hands a print of a memorandum prepared by the officers of the Association in interpretation of the statutes dealing with the subject, with a request that he would submit the same to the Board of Inland Revenue, that it might be issued to the trade on the joint authority of the Association and the Commissioners. He was pleased to inform the Committee that the following communication had been received from Somerset House, with the accompanying memorandum as approved by the Board:—

"Inland Revenue, Somerset House,
"London, W.C.,
"*November* 29, 1886.

"Dear Sir,—I have, in conjunction with my colleague, Mr. Bright, very carefully considered the draft, which you left at this office last month, of the Memorandum to be issued by your Association in regard to the Medicine Stamp Duties, and I now send you a copy of the revised draft as approved by the Commissioners.

"You will please understand that it is a condition of the Commissioners' approval that the printed extracts from the Acts of Parliament be subjoined to the Memorandum which is explanatory of those Acts.

"I should be much obliged if you would send me a few copies of the Memorandum when ready for issue.

"Yours faithfully
(Signed) "J. N. Crafer.

"W. H. Haydon, Esq."

"Memorandum from the Chemists and Druggists' Trade Association of Great Britain.

"*Medicine Stamp Duty Acts.*

"On the 12th April last, a deputation from the Chemists and Druggists' Trade Association of Great Britain, on the subject of the administration of the above Acts, was received by the Board of Inland Revenue. The discussion which then took place was fully reported in the Trade Journals of the 22nd April, 1886, from which it will be seen that it was arranged that a Memorandum should be drawn up by the Association, and submitted to the Inland Revenue Authorities in explanation of the provisions and administration of the above-mentioned Acts (printed extracts from which are subjoined). This Memorandum has accordingly been prepared and approved by those authorities.

"In circulating it, the Executive Committee of the Association desire to point out that it is not intended to be a precise or exhaustive disquisition on the law—it is issued as a general guide only, for there is now no necessity to do more than direct the attention of the trade to the general provisions of the Statutes as at present administered. The opinion of the Department can be obtained by any Chemist and Druggist in each particular instance of doubt or difficulty, by addressing a letter of inquiry to The Honourable the Commissioners of Inland Revenue, Somerset House, London.

"In many cases the labels *per se* do not render the preparations to which they relate liable to Medicine Stamp Duty, but nevertheless, the preparations are made so liable by the publication of other printed or written matter. It should therefore be clearly borne in mind that when labels are sent to Somerset House for the opinion of the authorities they must be accompanied by all the printed or manuscript matter (including handbills, advertisements, etc.) which relates to the particular preparation in question. The labels, etc., should be sent in duplicate.

"The Commissioners decline to advise on variations of the same label and thereby to assist persons in framing labels, so as to avoid the charge of the duty.

"It will be seen from the Acts that, broadly speaking, there are four separate and distinct grounds on which liability to Stamp Duty may attach to a medicine which is not mentioned by name in the Schedule to the Act 52 Geo. III., cap. 150, viz.:—

(1) A claim, whether well founded or not, to any secret or art in the preparation.
(2) A claim, whether well founded or not, to any proprietary right in the preparation.
(3) The sale of the preparation, either present or past, under the authority of Letters Patent.
(4) The use at any time of any handbill, label, or advertisement holding out the preparation as a nostrum, proprietary medicine, or specific, or recommending it as beneficial for the prevention, cure, or relief of any distemper, malady, or ailment affecting the human body.

"With respect to the statutory exemptions, the terms of those applicable to pure and unmixed drugs and articles of confectionery not vended as medicines are clear and unmistakable, and as to the exemption in 3 and 4 Will. IV., c. 97, s. 20, it follows from the decision of the Court of Appeal in the case of the Attorney-General *v.* Lamplough (L. R. 3, Exch. Div. 214) that effervescent preparations similar in composition to Lamplough's Pyretic Saline are exempt from duty.

"In practice the Commissioners hold that liability does not attach in respect of preparations to be burned and the fumes inhaled or smoked, though they may be recommended for the cure or relief of disorders. Such preparations are not regarded as "used or applied externally or internally."

"Toilet articles are not liable unless recommended as preventing, curing, or relieving any ailment or disorder, but many of these preparations are liable as being recommended for the prevention or cure of chilblains, toothache, neuralgia, etc.

"In designing a label for any medicinal preparation on which it is desired not to pay stamp duty, care must be taken to avoid any expression or phraseology which can be construed as representing:—

(1) That the preparation of the medicine is a secret, or that the medicine is a specialty of any person, or that it is made in conformity with any special recipe. For instance, such fancy names as "The City of Liverpool Cough Lozenges," "St. Mark's Linctus," "Mephisto Corn Paint," etc., must be avoided.
(2) That it is the preparation of any particular person, or that anyone has a proprietary right in its manufacture or sale, for example, "Smith's Liver Pill," "Neuralgic Tincture, prepared only by Jones."
(3) That it will prevent, cure, or give relief in any disorder.

"It should be remembered that not only should all such expressions be avoided on the label itself, but also in all references to the medicine, whether on the label, wrapper, or cover, or in any printed or manuscript matter whatever, including newspapers, handbills, posters, showcards, advertisements, almanacks, lists, etc.

"It is well established that where any such expressions have been so used at any time before sale the medicine is thereby rendered liable to stamp duty, even though the actual label on the package is entirely innocent.

"The Revenue authorities have always recognized the necessity that exists for giving to a preparation such a designation or name as shall distinguish it from other medicines, and they do not attribute any further meaning to such words as cough mixture, liver pills, lip salve, teething powders, corn paint, etc., etc.

"Medicine Duty.

"*Stamp Duty.*

"44 *Geo. III., c.* 98, *Schedule B.*—For and upon every packet, box, bottle, pot, phial, or other inclosure containing any drugs, herbs, pills, waters, essences, tinctures, powders, or other preparation or composition whatsoever used or applied or to be used or applied externally or internally as medicines or medicaments for the prevention,

cure, or relief of any disorder or complaint incident to or in anywise affecting the human body, which shall be uttered or vended in Great Britain, where such packet, box, bottle, pot, phial, or other inclosure with its contents shall not exceed the price or value of one shilling £0 0 1½

	s.	d.		s.	d.			
Shall exceed	1	0	and not exceed	2	6	0	0	3
,,	2	6	,,	4	0	0	0	6
,,	4	0	,,	10	0	0	1	0
,,	10	0	,,	20	0	0	2	0
,,	20	0	,,	30	0	0	3	0
,,	30	0	,,	50	0	0	10	0
,,	50	0	. . . . .			1	0	0

"*Medicines charged with Stamp Duty.*

"52 *Geo. III.*, *c.* 150.—The various articles specified by name in the schedule, and also all other pills, powders, lozenges, tinctures, potions, cordials, electuaries, plasters, unguents, salves, ointments, drops, lotions, oils, spirits, medicated herbs and waters, chemical and officinal preparations whatsoever, to be used or applied externally or internally as medicines or medicaments, for the prevention, cure, or relief of any disorder or complaint incident to or in anywise affecting the human body, made, prepared, uttered, vended, or exposed to sale, by any person or persons whatsoever.

"Wherein the person making, preparing, uttering, vending, or exposing to sale the same, hath or claims to have any occult secret or art for making or preparing the same;

"Or hath or claims to have any exclusive right or title to the making or preparing the same;

"Or which have at any time heretofore been, now are, or shall hereafter be prepared, uttered, vended, or exposed to sale under the authority of any letters patent under the Great Seal.

"Or which have at any time heretofore been, now are, or shall hereafter be, by any public notice or advertisement, or by any written or printed papers or hand-bills, or by any label or words written or printed, affixed to or delivered with any packet, box, bottle, phial, or other inclosure containing the same, held out or recommended to the public by the makers, vendors or proprietors thereof as nostrums, or proprietary medicines, or as specifics, or as beneficial to the prevention, cure or relief of any distemper, malady, ailment, disorder or complaint incident to or in anywise affecting the human body.

"*Exemptions.*

"52 *Geo. III.*, *c.* 150.—All medicinal drugs whatsoever which shall be uttered or vended entire, without any mixture or composition with any other drug or ingredient whatsoever.

"55 *Geo. III.*, *c.* 184, *s.* 54.—Ginger and peppermint lozenges or any other article of confectionery, unless the person vending the same shall vend the same as medicines, or as beneficial for the prevention, cure or relief of any distemper, malady, ailment or disorder incident to or in anywise affecting the human body.

"3 *and* 4 *Will. IV.*, *c.* 97, *s.* 20.—All artificial mineral waters, and all waters impregnated with soda or mineral alkali, or with carbonic acid gas, and all compositions in a liquid or solid state to be used for the purpose of compounding or making any of the said waters.

"*Directions.*

"42 *Geo. III.*, *c.* 53, *s.* 3.—The duties to be paid by the proprietors, compounder or first vendor, before the preparation is sold or exposed for sale, or delivered out of his custody or possession for sale, either wholesale or retail, either for foreign or home consumption.

"52 *Geo. III.*, *c.* 150, *s.* 2.—The labels are to be so affixed that the packet, box, bottle, pot, or other inclosure cannot be opened and the contents poured out or taken therefrom without tearing the label, so as to prevent its being made use of again.

"*Excise Licence.*

"38 *Vict.*, *c.* 23, *s.* 8.—An Excise licence is required to be taken out yearly in any part of Great Britain by the owners, proprietors, makers and compounders of and persons uttering, vending or exposing for sale, or keeping ready for sale any medicine liable to stamp duty.

The duty on each such licence is . . . . 5*s.*

"*Any person selling an article liable to stamp duty without having a licence incurs a penalty of* £20 *under* 42 *Geo. III.*, *c.* 56, *s.* 9;

"*And any person, whether licensed or not, selling any such article unstamped, incurs a penalty of* £10 *in respect of every offence under* 52 *Geo. III.*, *c.* 150., *s.* 2."

The Secretary was instructed to forward a copy of Mr. Crafer's letter and the Memorandum to the trade journals, with an intimation that a print of the latter would be supplied to any member of the Association on application to the Secretary.

The following report of the Finance Committee which had been printed and circulated among the Executive was then taken as read:—

"*Report of the Finance Committee to be presented to the Executive at their Meeting on January* 14, 1887.

"Since the last meeting of the Executive, your Finance Committee have held two meetings. At the first, held on December 17 last, the Secretary's Cash Statement and all books of account were examined and passed up to November 30, and several accounts were examined and ordered to be paid.

"The second meeting of your Committee, which took place on the 5th instant, was convened to consider the extremely critical financial position of the Association. The Secretary then stated that although the outstanding subscriptions represented on paper £343, yet the expenditure from January to June, 1886, inclusive, was £546, whilst the sum collected in subscriptions and donations during the same period amounted to only £146. Under these circumstances a temporary collapse of the Association appeared imminent, unless prompt steps were taken to avert the same.

"After some considerable discussion, your Committee determined to convene a special meeting of the Executive to consider the best means to be adopted for placing the Association in a sound financial position, either by making a special appeal to the trade for funds to enable the work to be carried on until the close of the present financial year, when an increased subscription might be levied, or by re-organizing the Association forthwith on the basis of an increased subscription.

"Annexed to this report is a statistical abstract of income and expenditure account since the formation of the Association to April 15th last.

"By Order of the Committee.

"W. F. HAYDON,
"*Secretary.*

"*Office of the Association,*
"23, *Burlington Chambers, New Street,*
"*Birmingham, January* 7, 1887."

It was moved by the President, seconded by Mr. Chapman, and unanimously resolved:—

"That the report of the Finance Committee be received, adopted, and entered in the minutes."

The Chairman said the next matter on the agenda was the serious business of the day, viz.,—To decide on the steps to be taken to place the Association in a sound financial position. They were asked to decide upon the steps to be taken to place the Association in a sound financial position. That at once implied they were not in a good financial condition, and he was afraid that those who, like himself, had read the report just adopted, would agree with him that the Secretary was perfectly justified in putting the announcement on the agenda paper in the form he had done. They had taken time by the forelock, and he could not believe for a single moment that an Association such as theirs would

Statistical Abstract of Income and Expenditure Account.

Audit year.	No. of members.	Amount received in subscriptions.	Amount received in donations.	Total income.	Total expenditure.	Income per member.	Expenditure per member.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.	s. d.
1876–7 . .	2280	720 0 0	1028 16 6	1748 16 6	1039 16 9	12 1	7 2
1877–8 . .	3940	985 0 0	375 19 6	1360 19 6	1331 8 7	6 10	6 9
*1878–9 . .	4570	1142 10 0	1645 19 6	2788 9 6	2064 14 8	12 2	9 0
1879–80 .	4857	1214 5 0	143 10 0	1357 15 0	1248 12 2	5 7	5 1
1880–1 . .	4345	1086 5 0	71 16 6	1158 1 6	1024 2 10	5 3	4 8
1881–2 . .	2765	691 5 0	179 7 0	870 12 0	1041 3 8	6 3	7 6
1882–3 . .	2743	685 15 0	63 4 6	748 19 6	876 19 9	5 5	6 4
1883–4 . .	2632	658 0 0	68 13 0	726 13 0	750 4 11	5 6	5 8
†1884–5 . .	2449	612 5 0	513 14 0	1125 19 0	850 0 4	9 2	6 11
1885–6 . .	2317	579 5 0	285 7 0	864 12 0	1060 13 4	7 5	9 1
Average of ten years .	3350	837 9 0	437 12 9	1275 1 9	1127 11 8	7 6	6 9

entirely disappear when they came to consider the large amount of work that had been done, and done with so much discretion; that they had uniformly adopted the principle of defending the weak and upholding the right of their business or profession under all conceivable circumstances in all cases where there had been a good and sufficient reason. Surely there was no chemist who would refuse to contribute the small subscription he was asked to furnish the Association with. It was the unfortunate apathy which pervaded the ranks of chemists and druggists that had brought them to their present deplorable position, and it was only when some occasional circumstance caused the members to make a spasmodic effort that the organization rose to the level of perfect solvency. Unfortunately, he himself had to confess to one mistake in connection with the Association. He now saw quite clearly that a 5*s.* subscription was totally inadequate to meet the needs of an Association such as theirs; they had defended several of their members and had trampled upon persecutions to a greater extent than most chemists and druggists had any conception of. So long as it was known that an Association like that existed to defend the legitimate interests of the trade, so long had their enemies been chary of attacking them, and doubtless had it not been for the existence of the Society many more cases where defence was required would have cropped up. They had prosecuted forty-four illegal traders under the Pharmacy Act, and they had done what was better than defend or prosecute, namely, advised 4763 members of the trade since their office was established. They had held no less than 221 formally convened meetings and the money they had expended in doing all this work had been very moderate indeed. He therefore hoped that that meeting would in some practical way devise a means of conveying the importance of the Association to the rank and file of the chemists and druggists in the country, and he hoped and believed that the position they found themselves in at the present time would before their next Annual Meeting be reversed.

In answer to a question, the Secretary said that at the present time there was £52 5*s.* 11*d.* in hand, but the actual outstanding accounts, not including accruing liabilities, such as rent and official salaries, amounted to £123 2*s.* 10*d.*, leaving a balance against the Association of £70 16*s.* 11*d.* The outstanding subscriptions would, of course, more than meet this deficiency, but at present those assets merely existed on paper, and were not available cash.

Mr. Holdsworth (Treasurer) said there were several accounts owing, and he should not be at all disposed to sign cheques, seeing that the Association had no assets

* Apothecaries Co. *v.* Shepperley.
† Poisons Bill in House of Lords.

He thought, therefore, it behoved the Executive to deal with the matter very promptly. Something must be done in order to make the Association to go on through the year, and to pay off its liabilities.

Mr. Barclay said he felt sure that there was strength and force enough in the Association and the Executive to carry them over their present difficulties. They had gone through a great many difficulties, and he thought if they all put their shoulders to the wheel they would be able to face those which existed at present. As the Treasurer stated, the funds were practically *nil.*

The Secretary: There is a balance really against you.

Mr. Barclay: That is worse than *nil.* They had five or six months before them yet before they would be able to ask for a renewal of their subscriptions. So far as they could calculate they would require something like £500 or £600 to carry on the work of the Association up to June, when the subscriptions were again due. As far as he could see they had two or three alternatives. One was to send the hat round again, as had been done so frequently, and endeavour to get something like £500 before the Annual Meeting. They certainly knew that previously the response to such appeals had been anything but satisfactory, unless there had been some scare among the members of the trade, or the interests of the trade were seriously and immediately jeopardized. Another alternative would be to call a special meeting of the whole trade, place before it the financial condition of the Association, ask for an increased subscription, and date back the financial year to commence in January instead of in June. That would of course be asking for two subscriptions for the one year. Further, he thought it would be necessary to raise the subscription to at least 10*s.*, and then in many instances people would send 10*s.*, whereas they would not trouble about the 5*s.* The only other alternative was to wind up the affair as nicely as possible, to say the trade had not supported them, and that they must in consequence dissolve the Association. He would move:—

> "That the Secretary be requested to visit London and the principal towns, and endeavour to raise funds to carry on the work of the Association to the end of the month of June next, and that resolutions be moved at the next Annual Meeting of the Association to raise the amount of the annual subscription from 5*s.* to 10*s.*, and to make such alterations in the Rules of the Association as the Urgency Committee shall recommend after an inquiry into the working and organization of the Association as will tend to increase the membership and reduce the expenditure."

Mr. Churchill seconded the resolution.

Mr. Jervis said he had always argued that it was not possible to carry on the Association with so small an annual subscription as 5*s.*; for that paltry amount the organization had taken upon itself an immense amount of responsibility. It was absolutely imperative if they were to succeed that they should raise the subscription.

Mr. Harrison said he thought endeavouring to collect two subscriptions in one year would be a dangerous procedure, whilst there were many objections to going round with the hat. The chemists as a rule had got into such a sense of security that they seemed no longer to see the necessity of the Association, and until they had some burning question coming to the front they would not, he was afraid, become alive to the mistake they were making. If the 10*s.* subscription had the effect of reducing the membership to 2000 it would be better than having 4000 at 5*s.*, as the field of their operation would be less and their expenditure consequently not so great.

Mr. Jones (Llanrwst) said he agreed with the suggestions of Mr. Barclay. He urged the importance of local secretaries exerting themselves, in the immediate neighbourhoods where they were located, to obtain new subscriptions and collect arrears. He also expressed the opinion that if they were called upon to contribute an annual subscription of a guinea to the Pharmaceutical Society, surely they could afford half-a-guinea subscription to the Chemists and Druggists' Association.

Mr. Parker thought that if some of the members of the Executive organized meetings in the principal centres of the country, and explained fully the work done by the Association, together with its present financial position, that there would be a satisfactory response. He also believed in a personal canvass being made as a means of getting subscriptions.

Mr. Chapman said there were 8000 or 9000 chemists in Great Britain, and out of that number there were only practically about 2000 subscribers to the Association. He thought the bulk of the chemists should be asked whether the Association should be continued or not.

The resolution was then put to the meeting and carried unanimously.

The meeting then considered the Shop Hours Regulation Bill, and decided to take no action upon it at present.

Mr. Holdsworth said what action was he to take in regard to signing cheques on behalf of the Association? There was scarcely any money in the bank, and there were obligations outstanding. He was not prepared to advance any money, and was not prepared to give any guarantee to the bank for any overdraft that they might allow in case they had to ask for it. He did not suppose the Executive would expect him to do that; therefore he wished them to look carefully at the matter and decide what steps should be taken.

The Chairman said he was sure that every member of the Executive felt they could not possibly ask Mr. Holdsworth to make a personal guarantee in the matter. They were sufficiently obliged to him for the work he had done, without asking him to take any personal responsibility.

Mr. Barclay said he thought Mr. Holdsworth should hold his hands for a time—there was nothing pressing except office expenses—until the Secretary had made an effort to get in some money. If the effort proved barren, then the Finance Committee at the back of Mr. Holdsworth would have to take means to wind up the Association.

Mr. Hart: I think we cannot do better than leave it in the hands of the Finance Committee to act as they think proper.

The Chairman: Well, if the Secretary's efforts do not succeed we must wind up the Association.

Mr. Holdsworth said he should sign no cheque unless there was money in hand to meet it.

The Chairman: I think that is the more healthy course to pursue.

Proceedings of Societies in London.

ROYAL INSTITUTION OF GREAT BRITAIN.

Suspended Crystallization.*

BY PROFESSOR JOHN MILLAR THOMSON, F.C.S.

The phenomena attending the ordinary solution of metallic salts in water have been so often and ably brought before the consideration of this audience, that I have determined to confine myself this evening to certain considerations relating to the formation of and deposition from so-called supersaturated solutions of these salts. At the same time it is necessary for me to remind you of one or two points connected with the ordinary solution of a salt in water, which I may enumerate as follows.

The solubility of a salt in water depends:—

(*a*) On the mass of salt presented to the water for solution, and the state of aggregation in which that mass may be at the time of solution.

(*b*) The temperature at which the solution of the salt is carried out; rise in temperature generally producing an increase in the solubility of the salt, although there are certain exceptions to this rule.

(*c*) Each salt has its own definite rate or amount of solubility; some being extremely soluble, as calcium chloride or sodium acetate; others having a very low amount of solubility, as calcium sulphate.

(*d*) On the cooling of a hot solution containing large quantities of salt, a deposition of the salt takes place, which deposition is known under the term "crystallization."

Certain salts, however, which generally present abnormal phenomena in their solution show no tendency to be deposited from their solutions on cooling, provided such solutions are kept covered from the access of the outside air. Such solutions are said to have become supersaturated.

This branch of the subject is the one which will engage our attention.

It may be divided into two classes. (1) That which occurs in the presence of the undissolved salt; and (2) That which occurs in the absence of the undissolved salt; this latter class being the one we shall examine.

Glauber's salt (sulphate of soda) affords a very good example of this. If the crystallized sulphate be added to boiling water in a flask, as long as it is dissolved the water will take up nearly twice its weight of salt. If this solution be now allowed to cool in an open vessel, an abundant deposition of crystals will take place, as the water when cold will only dissolve about one-third of its weight of crystallized sulphate. But if the flask be tightly corked or stoppered with cotton wool whilst the solution is boiling, it may be kept for several days without crystallizing, although moved about from place to place. On withdrawing the plug, however, the air on entering the flask will produce a slight disturbance of the surface of the fluid, and from that point beautiful prismatic crystals shoot though the solution until the whole has become perfectly solid.

It is not necessary in preparing such solutions that the flask be closed completely with a stopper, as we find that plugging the neck with cotton wool exercises the same effect in preserving the solution, and that the air which enters the flask during the cooling becomes thoroughly deprived of its crystallizing influence, evidently undergoing a filtering process. A very good instance of the inability of filtered air to start crystallization is afforded by a solution of alum saturated at 194° F., and allowed to cool in a flask stoppered with cotton wool in the manner previously described. On withdrawing the plug of cotton wool the crystallization, which in this case takes a much longer time to commence than with the sulphate of soda, will be seen beginning at various points on the surface of the liquid, and will spread slowly from

* Read, Friday, May 14, 1886.

these, octahedral crystals of alum half an inch or more in length being built up in a few seconds.

It is evident from these two experiments that the cause of this sudden crystallization is to be sought for in the peculiar action of the air when it comes in contact with the solution; but that it is not due to the action of the air alone is shown by the fact that the air in the flask plugged with cotton wool must enter during the cooling, and that therefore the action of the cotton by filtering the air in some way deprives it of its active property.

But it will be found that there are other means of destroying this activity without filtering the air through cotton wool. Thus, if the solution of sodium sulphate containing two-thirds of its weight of crystallized salt be allowed to cool in a flask closed by a cork, furnished with two tubes plugged with cotton wool; on removal of the cotton plugs, air may be blown from the lungs through the longer tube without causing the crystallization, apparently from the fact that the air has been deprived of the nucleus which induces the crystallization by passage through the lungs. On blowing air, however, from a bellows, after a few strokes the solution will be found to solidify almost instantaneously.

The earliest ideas concerning this sudden solidification were naturally those which supposed that the mere entrance of air into the flask upon opening it started the crystallization. The late Dr. Graham, and Professor Thomas Thomson, held this view; and the former of these chemists carried out a considerable series of investigations on the action of different gases in determining the crystallization. These ideas were followed by the statement of Ziz, that not only air but also solids were capable of acting as nuclei when dry, but that when wet, or boiled with the solution, or placed in it when hot, and allowed to cool at the same time with it, they lose their effect. The activity of air, however, as in itself a nucleus, has been subsequently shown by Löwel to be incorrect; but at the same time he admits that solid bodies after exposure to air become active.

In 1851 two chemists, Selmi and Goskynski, introduced the explanation that dry air is active by virtue of its getting rid of the water at the surface, thus producing small crystals which continue the action. This seems to be a repetition of the theory propounded by Gay-Lussac, who held that the air absorbed at the surface precipitated a portion of the salt in the same way that one salt precipitates another, and that this deposition continued the crystallizing action. By an elaborate series of investigations, conducted in 1866, and also during later years, the French savants, MM. Gernez and Violette, came to the conclusion that there is only one nucleus for a supersaturated solution, and that is a crystal of the body itself; also indicating in certain experiments that substances which possess the same crystalline form and chemical structure may be found active to supersaturated solutions of each other. They have conclusively shown at the same time that heated or washed air, or bodies of different constitution but chemically clean, remain perfectly inactive as regards their supersaturated solutions.

That disruption of the solution may take place without causing crystallization when the body added is perfectly clean may be easily shown by carefully removing the cotton plug from a solution of sodium sulphate containing only two-thirds its weight of crystals. On introducing a perfectly clean platinum wire no crystallization is induced, but on removing the wire and touching it with a substance which has not previously been rendered chemically clean, and on again introducing it in the flask, the moment it touches the liquid crystallization is at once induced.

This question of the nuclear action of substances upon these solutions has received considerable attention from English chemists, most notably from Mr. Tomlinson, Professor Liversidge, and Professor Grenfell, all of whom have conducted elaborate researches on the subject, leading, however, to different conclusions with each investigator. The arguments held by Tomlinson are strongly in support of some physical cause for the phenomenon, and that the result may be brought about by the action of substances possessing no chemical relations to the solutions experimented on. Professor Liversidge, on the other hand, has tried the action of several substances with the most careful precautions, that their addition to the solutions should be effected without contamination from, or access of, the external air to the flask during the experiments. The result of his inquiries, so far as the substances he has experimented with are concerned, confirms those of Gernez, and limits the number of bodies capable of acting as nuclei within very narrow limits. In fact, he concludes that the only body capable of causing the crystallization of such solutions is a crystal of the substance itself, of exactly the same composition as it possesses when in a state of supersaturation. Thus Glauber's salt, which exists in a supersaturated solution, combined with ten parts of water, will only crystallize by the addition of a crystal of the substance also containing ten parts of water, and is perfectly inactive to crystals of the same salt which contain seven proportions of water, or those which are anhydrous.

As it is almost impossible to conceive that our atmosphere is laden with minute particles of the many different metallic salts which we are acquainted with, some hesitation in accepting such a limited explanation may be excusable; but when we consider that it has been shown by Dr. Angus Smith and others that the air, especially in the vicinity of large manufacturing towns, is filled with small particles, more especially of Glauber's salt, we are not surprised that solutions of this body at least crystallize at once on the removal of the filtering medium. And the probability of the explanation may be further strengthened by the fact that these solutions when opened in the still air of country places may retain their liquid condition for considerable lengths of time.

At the same time the limit fixed by Professor Liversidge may appear a somewhat narrow one, and experiments, made some time ago and published in the *Journal of the Chemical Society of London* (May 1879, and September 1882), have confirmed a few experiments first indicated by Gernez, and go a considerable length in showing that bodies possessing not only the same crystalline form but an identical chemical structure are active nuclei in causing the crystallization of supersaturated solutions.

In these experiments two methods for the addition of the nuclei intended to excite crystallization were adopted. The first of these consisted of a flask and bulb tube, the supersaturated solution of the salt to be experimented on being placed in the flask, whilst the small bulb was filled with a solution of the body intended to act as nucleus. The solution in the bulb having been thoroughly boiled, the tube is stoppered with cotton wool and then introduced through the centre of a second cotton plug into the neck of the flask. The contents of the flask are now heated, the contents of the bulb receiving a second warming from the steam rising from the solution in the flask. The flasks so prepared are then allowed to stand till perfectly cold before performing an experiment. When it was desired to perform an experiment the solution of the body intended as nucleus contained in the bulb tube is first crystallized by touching with a platinum wire, or preferably by introducing a crystal of the salt contained in the bulb. Crystallization having thus taken place in the bulb, and the crystal added having become enclosed in the fresh deposit, the bulb is lowered into the liquid contained in the flask and allowed to remain there for some time to show that the disturbance produced by its introduction into the fluid does not excite crystallization. The bulb is finally lightly broken under the fluid and the result observed. Bulbs also containing

water, pieces of washed glass, etc., may be broken under the supersaturated solutions, to show that the disruption produced on breaking does not excite crystallization.

A second method which may be employed for the introduction of nuclei is that introduced by Professor Liversidge.* This consists of a siphon tube, in which crystallization is induced in the first limb and allowed gradually to pass over the bend and down to the point of the second limb.

(*To be continued.*)

Parliamentary and Law Proceedings.

THE COUNCIL OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* HUDSPITH.

At the Durham County Court, on the 17th inst., before his Honour Judge Meynell, the Council of the Pharmaceutical Society of Great Britain sued T. Hudspith, of 7, High Street, Langley Moor, near Durham, to recover a penalty of £5 for selling or keeping open shop for the sale of poison, and a further penalty of £5 for taking, using, or exhibiting the title of chemist or druggist contrary to the provisions of the Pharmacy Act, 1868.

Mr. T. C. Granger, Barrister, appeared for the Council; defendant appeared in person.

Mr. Granger stated that the defendant made sales of poisons, and in so doing used the label of a registered chemist and druggist carrying on business in Durham, and that he also carried on a business which he described upon his labels as that of "Botanic Druggist." A purchase of laudanum was in December last made at the defendant's shop, and it was submitted that the defendant had under the circumstances incurred a penalty for keeping open shop for the sale of poison, and a further penalty for using the title of druggist.

Richard Addison, examined, proved that on December 16 last he went to the defendant's shop, 7, High Street, Langley Moor, and made several purchases, viz., of two pennyworth of laudanum, a parcel of the defendant's herb beer packets, and two pennyworth of spirit of camphor. The bottle containing the laudanum was labelled with the name of "J. Lambert, Dispensing Chemist and Druggist, 7, High Street, Langley Moor, near Durham." The bottle containing the spirit of camphor was wrapped up in a bill at the foot of which were the words, "Sold by J. Lambert, Managing and Dispensing Chemist, at T. Hudspith's, Medical Botanist." The herb beer packet bore the defendant's name, and the description "Botanic Druggist." On the 14th inst. he handed the laudanum to Mr. Fowler for analysis.

Mr. William Fowler, pharmaceutical chemist, of Sunderland, examined, proved that he had analysed the contents of the bottle and found it to be tincture of opium.

Mr. George Salkeld, examined, proved that he was rate collector for the district which included High Street, Langley Moor; that the defendant was the occupier of the premises, 7, High Street, and that his name was still over the shop door.

The defendant submitted that by arrangement with Mr. Lambert he was allowed to sell poisons, using Mr. Lambert's label thereon; but he admitted that he was proprietor of the business carried on at 7, High Street, Langley Moor.

Mr. J. Lambert, called and examined by the defendant, proved that he was in no way interested in the business, and that what he had done was to give the defendant permission to use his label, if it was in conformity with the law.

His Honour gave judgment for the penalties sued for, and gave costs on the higher scale.

* *Proc. Roy. Soc.*, xx., 497.

Obituary.

Notice has been received of the death of the following:—

On the 30th of September, 1886, Mr. Benjamin Wrigglesworth Gibson, Chemist and Druggist, Barnard Castle, Durham. Aged 68 years.

On the 28th of December, Mr. Ebenezer B. Sutcliffe, Chemist and Druggist, Withington, near Manchester. Aged 51 years.

On the 6th of January, 1887, Mr. James Merrell, Pharmaceutical Chemist, Queen's Terrace, Camden Road, N.W. Aged 62 years. Mr. Merrell had been a Member of the Pharmaceutical Society since 1853.

On the 10th of January, Mr. John Dyer, Chemist and Druggist, Ramsgate. Aged 69 years.

On the 11th of January, Mr. Marshall Beddington, Chemist and Druggist, Robin Hood's Bay, near Whitby. Aged 49 years.

On the 11th of January, Mr. Edward Worsey, Chemist and Druggist, New Road, Woolwich. Aged 62 years.

On the 14th of January, in Paris, Mr. James Alderton, Chemist and Druggist, Finstock, Charlbury, Oxon. Aged 29 years.

On the 15th of January, Mr. Meshach Roberts, Chemist and Druggist, High Street, Bangor. Aged 68 years. Mr. Roberts had been a Member of the Pharmaceutical Society since 1872, and was Local Secretary for Bangor.

On the 16th of January, Mr. George Rumble, Chemist and Druggist, High Street, Lincoln. Aged 66 years.

Review.

HANDBOOK OF VOLUMETRIC ANALYSIS—applied to Liquids, Solids and Gases — adapted for Chemical Research, Pathological Chemistry, Pharmacy, Metallurgy, Manufacturing Chemistry, Photography and Technical Purposes. By FRANCIS SUTTON, F.C.S., F.I.C., etc., etc. Fifth Edition.*

The advantages of a book of this description need no comment, collecting, as it does, into one volume, all the volumetric processes of any value, the original details of which are scattered through the vast mass of chemical literature. Its value is greatly enhanced by the fact that the various methods are carefully tested, and only those capable of giving fairly good results selected for insertion, any weak points or special precautions necessary being also pointed out. Accordingly, since its first publication in 1863, this book has become the standard work on the subject, and has been carefully revised at frequent intervals, as the introduction of new processes and the improvement of old ones has justified a new edition.

The present volume contains many valuable additions and improvements on the last edition (which bears date 1882), but shows signs of having been rather too hurriedly passed through the press, such slips as the substitution of $\frac{N}{10}$ for $\frac{N}{100}$ (page 165), "acid" for "alkali," and *vice versâ* (pages 74–75, citric acid), being rather too frequent. In the case just mentioned, moreover, the tartaric acid being already in the state of acid tartrate of potassium, each c.c. of normal alkali necessary to neutralize it would indicate 0·15 gram, not 0·075 gram of tartaric acid.

There is also a tendency throughout to put 0·76 m.m.

* London: J. and A. Churchill. 1886. Demy 8vo. Pp. i.—xi., 1—491. 16*s*.

instead of 0·76m, or 760 m.m., as the barometric pressure, and another slip of the same kind occurs in the formula for oxalate of bismuth, which is given on page 130 as $Bi_2O_3 3C_2O_4$.

Among the improvements in the new edition is the chapter on indicators, which now includes those azo-colours, etc., which have been found most useful and delicate, with particulars of the special reactions for which each is best suited, as well as those for which either of them has been found unsuitable. Many of the processes have, in consequence, been modified by the use of an indicator giving quicker or more delicate results than the one formerly recommended. There is also a summary of Thompson's researches on the sensitiveness of the various indicators, and the influence on them of the neutral salts formed in the titration. Two or three new methods for the estimation of alkaline hydrates, carbonates and bicarbonates, by the aid of phenacetolin, etc., are introduced and some modifications made in the technical processes for the analysis of soda ash, black ash, etc.

On page 55 occurs an error which was also in the previous edition. A comparison is made between a gravimetric and a volumetric analysis of salt cake, and the result by the latter method, viz., 96·48, is corrected by dividing by the constant factor 0·987. In the text the result has been multiplied instead of divided by this figure, and the result thus made to agree with the other, viz., 95·02, whereas if divided as stated it would amount to 97·75, and show a wide difference. If, as one is led to infer from the text, the figures are the result of actual experiment, they prove the contrary of what was intended.

In the analysis of soaps advantage is taken of the recent papers on the subject by Dr. Wright and C. Thompson, and Muter's copper test is recommended for the estimation of glycerine. The directions for the technical analysis of gas liquors are given in a manner suited to the manufacturer with no special knowledge of chemistry or chemical manipulation, and this necessarily involves a good deal of repetition. Among the many new processes to be found in this portion of the book we may mention the following:—Kjeldal's method for estimation of nitrogen; use of a mixture of KI and KIO_3 with starch as a delicate indicator of acidity; the estimations of sulphocyanides; Sb in presence of Sn; H_3PO_4 with methyl orange and phenolphthalein; iodine in presence of Cl and Br, by means of H_2O_2, and Dupré's modification of Schützenberger's method of estimating free oxygen in waters. On the other hand some of the less satisfactory processes for the estimation of phosphates, iron by cuprous chloride, sulphides by oxidation to sulsulphates, and the methods for estimating indigo, are omitted. An appendix to this portion also contains methods for estimating borates, oils and fats, glycerine, phenol, etc. The following portion of the book, which is devoted to the analysis of urine, potable waters, etc., is pretty much the same as in the previous edition, except that the whole of the article on soils and manures has now been omitted.

The very complete section on gas analysis has been further extended and enriched with several more illustrations of apparatus used in these operations, as well as descriptions of some simpler methods of gas analysis, which, although not so rigidly accurate as those previously described, still admit of approximate results being arrived at with far less expenditure of time and labour.

BOOKS RECEIVED.

THOMSON'S CONSPECTUS, adapted to the British Pharmacopœia of 1885. Edited by NESTOR TIRARD, M.D., F.R.C.P., etc. New Edition. London: Longmans,, Green and Co. 1887. From the Publishers.

THE BOVINE PRESCRIBER, drawn up for the use of Veterinary Practitioners and Students. By JAMES B. and ALBERT GRESSWELL. London: Baillière, Tindall and Cox. 1886. From the Publishers.

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE SUPPLY OF POISONS BY OILMEN.

Sir,—As an old member of the Pharmaceutical Society, may I trouble you to insert the following incident which occurred a few days ago in this locality?

A middle-aged woman brought into my shop a 2 oz. long white glass vial, asking to be supplied with a cork for the same, as she had been to an oilshop to purchase oil of vitriol. The bottle was three parts full, and the seller not being furnished with corks, had very ingeniously screwed up a piece of paper and stuck it in the neck of the bottle as a substitute. Taking the bottle in hand to fit a cork, I noticed that the bottle was labelled, but not "Oil of Vitriol," not "Poison," not even "Not to be taken," but with a good bold printed label bearing the words "Sweet Spirits of Nitre," with the name and address of a brother chemist living not far from me.

No attempt had been made to deface the label in any way. After acceding to the request, sticking a bold poison label with the name of the article completely over the other, and duly cautioning the woman, I did not consider I had done my duty until stating the above facts to you.

I fear that the experience of many chemists, both in London and the country, could reveal instances of similar culpable negligence. The incident itself is so suggestive, that I refrain from offering any comment.

97, Newington Green Road. B. COCKER.

"WHAT IS LAUDANUM?"

Sir,—The bulky correspondence on the above appears as so much padding to your valuable Journal. Some writers have taken a wrong text, and hold forth very learnedly on "What was Laudanum?" Well, sir, as to this, what matters it? "Let the dead past bury its dead." I presume every pharmacy in this country has in use a label "Laudanum—Poison," and I believe the said label is now always applied to tinct. opii.

Can we not change the topic and have a discussion on, "What is Epsom Salts?" or some other equally abstruse question!

In passing, I may say that I dispensed a prescription the other day in which one of our best local doctors (usually supplying his own physic, etc.), wrote "Tinct. opii meth. sig. laudanum—Poison."

I think I was justified in correcting the manuscript, and in substituting the proper article. A question arises, can this gentleman legally supply his patients with the methylated tincture, or keep it on his surgery shelf?

IGNORAMUS.

C. L. Reinhardt.—The nitrate is one of the most poisonous of the salts of mercury, and in applying it to animals care should be taken to prevent them licking it off.

Dens.—The subjects of the qualifying examination are practically the same as in Great Britain, but examination in the colony has to be preceded by an apprenticeship for four years and attendance at a course of lectures. An attempt is being made to provide for the recognition of diplomas between the different Australian colonies. Your question as to the Dental Register should be addressed to the Registrar under the Dentists Act, 299, Oxford Street, W.

F. C. F.—The directions given by Watts for the preparation of butyric ether are butyric acid, 2 parts, dissolved in an equal weight of strong alcohol, and 1 part of sulphuric acid added. Heat is developed, and butyric ether immediately begins to rise to the surface, but the mixture requires to be heated a short time to 80° C. to complete the conversion.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Armstrong, Brown, Bell, Botham, Reinhardt, Elborne.

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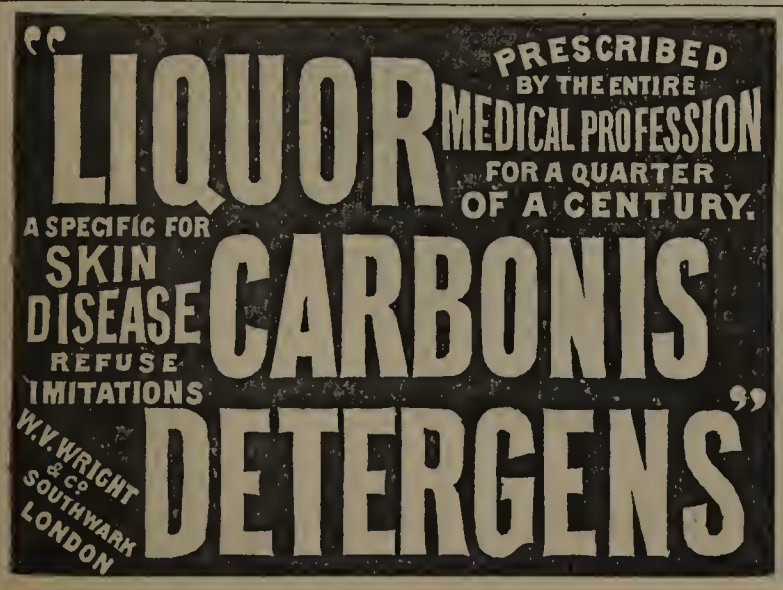

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Mr. W. MARTIN
„ W. W. SMEE

MINOR.

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„ T. E. B. BLANKLEY
„ J. R. BENTLEY
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PRELIMINARY.

Mr. H. W. BAKER
„ S. GREEN
Mr. F. R. MITCHELL
„ C. G. RACKHAM

(DECEMBER) **MAJOR.**

One Student only presented himself and passed.
Mr. C. B. GILSON.

MINOR.

Mr. G. W. BARRATT
„ W. H. BURRELL
„ G. W. BLANKLEY
„ J. F. COLE
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17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

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EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, February 9th, at half-past Seven o'clock.

The chair will be taken at Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Wednesday, February 2nd, as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

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,, and Nux Vomica		7 0	24 0
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,, ,,	1 gr.	5 0	16 0
,, ,,	2 gr.	7 6	26 0
,, ,,	3 gr.	10 6	38 0
,, ,,	4 gr.	13 0	48 0
,, ,,	5 gr.	16 0	60 0
,, Sulphate	1-4 gr.	5 0	16 0
,, ,,	1-2 gr.	5 0	16 0
,, ,,	1 gr.	5 6	18 0
,, ,,	2 gr.	8 0	28 0
,, ,,	3 gr.	11 0	40 0
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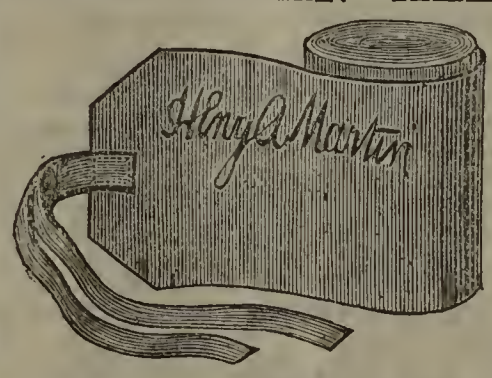

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Urethane, a new hypnotic for insomnia, is free from the dangerous effects on the heart and lungs, and the "injurious action on the gastric mucous membrane," of chloral hydrate, and is far pleasanter in its action than paraldehyde. It stimulates the respiration, but does not affect reflex irritability. Supplied in 5 gr. Tabloids. *Bottles of* 25, 27*s. per doz.; bottles of* 100, 87*s. per doz.*

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It was with this preparation that the original experiments were made, and it is this which has created the large demand for the drug. It is a "powerful expectorant," and Dr. MURRELL states that its systematic use was followed by marked improvement in every case of winter cough. Dose: 5 to 20 drops on sugar or in mucilage.

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The advantages of this over permanganate of potash are that it does not oxidise the mucous surfaces, and is the form the latter drug must take before it can enter the blood. Drs. RINGER and MURRELL found, in sixty-three cases of amenorrhœa treated with potass. permanganate, that the good effects were due to the manganese and not to the potash in the salt (*The Lancet*, Jan. 6th, 1883). The Tabloids of Manganese Dioxide are agreeable to take. Each contains 2 gr.

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This is supposed by some to possess a pleasanter action than the other salts of Caffeine. It is recommended as a cardiac tonic and diuretic, and more especially for headache. It will restore muscular power when exhausted. Bishop's Granular Effervescent Hydrobromate of Caffeine has given general satisfaction, and is highly praised by those who have tried it. 20*s. per doz. bottles.*

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"THE MONTH."

In a communication to the *British Medical Journal*, (Jan. 22, p. 151), Professor Frazer formally adopts the suggestions that have been made for a tincture of strophanthus more dilute than that originally used by him, the strength now chosen being 1 in 20, as first recommended by Mr. Martindale in this Journal (before, p. 503). The method of preparation now given by Professor Frazer is to reduce the seeds, freed from stalks and hairs, to a moderately fine powder, and dry the powder for twelve hours at a temperature of from 100° to 120° F. One ounce or one part of the powder is then packed in a percolator and ether, free from alcohol or water, is added until the powder is saturated and the ether begins to drop, when the percolation is stopped for twenty-four hours, after which it is allowed to go on slowly until 10 fluid ounces, or 10 fluid parts of ether, have been used ; if the last running of the ether is not almost colourless more should be used. The powder is then removed from the percolator and exposed to the air, or heated to 100° F. if necessary, to drive off the ether, any lumps being broken up, and the uniform, nearly white, dry powder is repacked in the percolator, and allowed to macerate in contact with sufficient rectified spirit for forty-eight hours ; after which rectified spirit is passed slowly through until twenty fluid parts of percolate have been obtained. Professor Frazer gives the dose of this tincture as from five to ten minims ; it may also be used in doses of half a minim to two minims frequently repeated. He describes it as nearly colourless, having a very pale yellow tinge, being neutral in reaction, and intensely and rather persistently bitter to the taste. It mixes unchanged with water, and is not precipitated by tannin ; the solution becomes opalescent on the addition of ether. Solution of perchloride of iron also produces a slight haziness and intensifies the colour, which after some hours becomes greenish-yellow.

Tincture of Strophanthus.

Bismuth subiodide appears to be coming into use in the United States as a topical application to indolent ulcers and generally as a substitute for iodoform, it being said to be quite as effective and free from the objectionable odour of that compound. It is described by Gmelin as a powder that is precipitated when bismuth iodide, formed by the fusion of the two metals, is boiled with water. But according to Mr. C. Mayo (*Amer. Journ. Pharm.*, Dec., p. 590), it can be prepared by triturating 306 parts of bismuth subnitrate and 165·6 parts of potassium iodide with sufficient hydrochloric acid to form a paste, which becomes yellow and is then thrown into water, where the reaction is completed, a heavy amorphous, adhesive, brick-red powder being precipitated. The product is represented by the formula BiOI, or $BiOI.H_2O$, and is insoluble in water, alcohol, ether and chloroform ; it is decomposed by strong mineral acids and alkalies. Mr. Mayo's process has, however, been criticized by Mr. England (*Amer. Journ. Pharm.*, Jan., p. 9) as yielding a product containing a considerable quantity of oxychloride as an impurity. The alternative process that Mr. England recommends is to dissolve the bismuth subnitrate in nitric acid, dilute with hot water and then to pour this solution, a little at a time, into a solution of the potassium iodide in hot water, agitating after each addition and continuing the agitation until the decomposition is complete. The precipitate is then filtered off, washed with warm water, dried and powdered.

Bismuth Subiodide.

Nickel bromide has also been employed medicinally as a hypnotic and a sedative. According to Mr. A. Drew (*Amer. Journ. Pharm.*, Dec., p. 592) it may be prepared conveniently by treating granulated nickel with bromine under water, and carefully evaporating the dark green solution, when the salt is obtained in deep green deliquescent crystals, freely soluble in water, but much less soluble in alcohol. The salt is conveniently administered in the form of a syrup, which may be prepared by placing 377 grains of bromine and 137 grains of nickel in a flask containing 12 ounces of water, digesting at a gentle heat until the reaction has ceased, filtering, and then adding 24 ounces of sugar and sufficient water to make 32 fluid ounces. The syrup, which is of a beautiful green colour, contains in each fluid drachm 5 grains of crystallized nickel bromide, which is an average dose.

Nickel Bromide.

Pending the appearance of saccharin in the market as a commercial article the interest in it is continued by the appearance of reports by experimenters who have been able to obtain samples. In one of the most recent, by M. Maumené (*Chem. Repert.*, Jan. 23, p. 10), the sample sent to him by Dr. Fahlenberg as "saccharin" is said not to have been a homogeneous substance, but to have consisted of at least two compounds, varying in their solubility in water and alcohol. He found that the two compounds could also be separated by the formation of a double salt by means of sodium chloride and that they were present in about equal proportions. M. Maumené states further that one of the compounds contained 15·6 per cent. of sulphur, whilst the other contained only 12·98 per cent. (Fahlenberg's formula would require 17·49 per cent.), and that the strong sweet taste was possessed by the former only. A compound such as Fahlenberg's "saccharin" ($C_7H_5NSO_3$) would, M. Maumené says, belong to the same class as taurin ($C_2H_7NSO_3$).

Saccharin.

In a recent communication to the German Chemical Society (*Berichte*, xix., 3109) Messrs. A. G. Perkin and W. H. Perkin, Jun., describe a crystalline body separated from kamala. It was obtained by shaking finely powdered kamala with carbon bisulphide, filtering and concentrating the yellow-brown solution up to a certain point upon a water-bath. Upon cooling a yellow-brown gelatinous precipitate separated, which was filtered off and again treated with a little carbon bisulphide to remove resinous impurities, after which it crystallized from toluol or benzol in small flesh-coloured crystals, which upon analysis gave results corresponding closely with the formula $C_{11}H_{10}O_3$. Messrs. Perkin propose for this substance the name "mallotoxin," as being derived from *Mallotus philippinensis*, but before adopting this suggestion it requires to be proved in what it differs from the compound obtained by Dr. Anderson in 1860 (*Edin. New Phil. Journ.*, n.s., i., 300), and named "rottlerin," which has been represented by the formula $C_{20}H_{22}O_6$. A curious point in the history of this compound appears to be that although Dr. Anderson found that a concentrated solution of the soluble portion of kamala in ether left to stand for a few days solidified to a mass of crystals

Kamala.

which were afterwards purified by recrystallization from ether and analysed, other chemists who attempted to separate from kamala a crystalline compound by means of ether entirely failed. In 1871, however, Mr. Daniel Hanbury observed a number of minute acicular crystals in an ethereal solution of kamala that had been allowed to evaporate spontaneously to a syrupy condition. These crystals were separated by Mr. T. B. Groves, to whom the solution had been entrusted, but during an attempt to purify them the substance underwent change and could then be obtained only in an amorphous condition, which Mr. Groves thought might be due to oxidation through having lost the protection of the mother-liquor (*Pharm. Journ.*, [3], iii., 228). On the other hand the authors of 'Pharmacographia' (2nd edit., p. 575) state that they succeeded in isolating the crystals from commercial "kamalin." It would appear probable that, as suggested by Mr. Hanbury, the age of a specimen of kamala may affect the occurrence in it of the crystalline constituent.

Testing of Quinine Sulphate.

The Commission appointed by the Pharmaceutical Society of Paris to inquire into the method prescribed by the French Codex for testing quinine sulphate has made its report (*Journ. de Pharm.*, [5], xv., 115). As a general result of the experiments carried out for this purpose it has been found that although the test gives excellent indications with pure quinine sulphate, even when the solution is made at a temperature of 15° C., the treatment of an impure salt with water at that temperature does not ensure the solution of more than a part of the cinchonidine sulphate present. The test is therefore defective when applied under that condition. A sample containing upwards of 6·5 per cent. of impurity gave results which only allowed of a suspicion when the solution was prepared at 20° C., but when the solution was made at 60° C. the presence of the cinchonidine salt was recognizable at once. Hence it is recommended that the solution of a salt to be tested should always be made at a temperature of 60° C. Incidentally, it has also been shown by these experiments that by the recrystallization of an impure sample of quinine sulphate containing cinchonidine salt the separation of this impurity can be carried so far that on applying to the product the Codex test with the proposed modification the result obtained does not differ materially from that obtained with absolutely pure quinine sulphate. The quantity of ammonia solution (0·960) required to be added to 5 c.c. of a solution of pure quinine sulphate saturated at 15° C. in order to precipitate and redissolve the alkaloid appears to be rather less than 5 c.c., and the difference of 2 c.c. between this quantity and that ordered in the Codex (7 c.c.) is considered to represent an amount of impurity of from 2 to 3 per cent., or about one half the amount that is considered to be allowable by the British Pharmacopœia.

Quinine Chromate.

M. Gallois calls attention (*Journ. de Pharm.*, [5], xv., 77) to a memoir published in 1862 (*Ibid.*, xli., 341) by André, in which quinine chromate and some other chromates of cinchona alkaloids are described and the application of the chromate for the assay of commercial quinine sulphate is suggested. The neutral quinine salt is there stated to be anhydrous, soluble in 160 parts of boiling water and in 2400 parts at 15° C., not liable to alteration by the action of light or when an aqueous solution is boiled, although in a dry state it is gradually decomposed at 100° C. The corresponding salt of cinchonine could not be obtained and it was found that on mixing solutions of neutral cinchonine sulphate and neutral potassium chromate there was a very great liability to a decomposition, resulting in the formation of an acid salt and liberation of cinchonine. Under the name of quinidine chromate a salt is described that, at that time, may perhaps have been in reality cinchonidine chromate, at least in part. It is said to form orange-red needles, to resemble the cinchonine salt in composition, and to be readily alterable under the influence of light. On mixing a solution of neutral quinidine (?) sulphate with one of neutral potassium chromate the same elimination of alkaloid was noticed as in the case of the cinchonine salt. According to the account given of these reactions by André it would appear that there is some further action upon the alkaloids than would be the case if the acids were merely interchanged between the bases by double decomposition. In any case it will be necessary to ascertain the precise nature of these reactions before the chromate method can be relied upon for testing quinine sulphate.

Gelsemium Alkaloids.

In an elaborate paper Mr. F. A. Thompson describes (*Pharm. Era*, Jan., p. 3) two alkaloids obtained by him from gelsemium root, thus confirming so far Messrs. Ringer and Murrell's hypothesis that the root contained two alkaloids, one of them exercising a paralysing and the other a tetanising influence. The alkaloids were obtained by percolating the finely powdered root mixed with freshly slaked lime with alcohol, shaking the percolate with chloroform, and then treating the chloroform solution with water acidulated with sulphuric acid. The separation of the alkaloids is effected by the addition of hydrochloric acid, the hydrochlorate of one of them, which is crystalline, being insoluble, and that of the other, which is amorphous, being soluble in its own weight of water. The crystalline alkaloid, for which Mr. Thompson proposes to retain the name "gelsemine," gave upon analysis results corresponding with the formula $C_{54}H_{69}N_4O_{12}$, differing, therefore, considerably from that attributed by Mr. Gerrard to the alkaloid analysed by him (*Pharm. Journ.*, [37], xiii., 641). The amorphous alkaloid has not yet been obtained sufficiently pure for analysis.

Alkaloids of Berberis Vulgaris.

A contribution towards clearing up the confusion concerning the *Berberis* alkaloids has been made by Dr. O. Hesse (*Berichte*, xix., 3190). Dr. Hesse states that in the root of *Berberis vulgaris* berberine is accompanied by at least four other alkaloids. Upon treating a mother-liquor of berberine hydrochlorate with soda, a dark coloured precipitate is thrown down, from which ether removes not only oxyacanthine, as stated by Wacker, but at least two other alkaloids, whilst another brown coloured amorphous base remains undissolved. The oxyacanthine may be obtained as sulphate by dissolving the mixture taken up by ether in acetic acid and adding sodium sulphate to the solution. By treating the mother-liquor with sodium nitrate another alkaloid can be separated that has been named "berbamine;" whilst the third alkaloid is thrown down by excess of ammonia. Oxyacanthine presents the peculiarity of having two widely separated melting points; when precipitated by ammonia from an aqueous

solution of the hydrochlorate as sulphate it forms a white flocculent mass, which loses water at 100° C. and melts between 138° and 150° C., but when crystallized from ether it forms anhydrous needles that melt first between 208° and 214° C. It forms well crystallized salts with acids and its composition is represented by the formula $C_{18}H_{19}NO_3$. In the presence of caustic alkali oxyacanthine readily undergoes modification to β-oxyacanthine, which is no longer soluble in ether, and which probably differs in the fixation of the elements of a molecule of water; but on treatment with hydrochloric acid the water appears to be separated again, normal hydrochlorate of oxyacanthine being formed. In this respect the alkaloid presents some resemblance to narcotine. Berbamine is also represented by the formula $C_{18}H_{19}NO_3$.

Choline in Ergot.

Statements have been made from time to time as to the occurrence of trimethylamine among the constituents of ergot; it is, however, generally accepted now that this base does not occur preformed in the fungus, but that when it has been found it has been a decomposition product due to improper methods of extraction. Some light has been thrown upon its possible source by the discovery in *Secale cornutum* of choline. This base has been separated and identified beyond doubt by Dr. L. Brieger, who obtained it pure and free from the least trace of trimethylamine (*Zeits. f. physiol. Chemie*, xi., 185). He is of opinion that any trimethylamine found in ergot will have been only a decomposition product of choline.

Synthetical Oil of Gaultheria.

At the last meeting of the Philadelphia College of Pharmacy (*Amer. Journ. Pharm.*, Jan., p. 8) attention was called by Mr. Charles Bullock to a synthetical oil of gaultheria which has been introduced into commerce in the United States. It was described as being colourless, and having an odour closely resembling that of the oil from the plant, a specific gravity of 1·176 and a boiling point at 398° F. When shaken with water the artificial oil gives the same reaction on the addition of chloride of iron as the natural oil; but they may be distinguished by the fact that when a few drops are shaken with water in a tube the artificial oil forms a "tinted" mixture and does not separate for some time, whilst the natural oil separates almost immediately in clear drops. The suspension of the artificial oil is said to be favoured by the presence of a small quantity of what appears to be methyl ether, which may be washed out, after which the artificial oil settles more quickly. It may be remembered that a sample of artificially prepared salicylate of methyl was the subject of a note by Mr. John Williams read at an evening meeting of the Pharmaceutical Society just eleven years ago (*Pharm, Journ.*, [3], v., 624).

Digitalin.

Whilst working out the toxicology of digitalin, M. Lafon has made the observation (*Archives de Pharm.*, Jan., p. 32) that this glucoside is not acted upon by diastase, pepsin, gastric juice, pancreatic juice, bile, beer yeast, emulsin or the putrefactive ferment. It is not, therefore, sensibly modified in the digestive canal; but it undergoes a profound alteration in the circulation, which is probably due to an oxidation process. It was also found that the detection of digitalin is not prevented by the action of alkalies, or that of sulphuric, phosphoric or hydrochloric acid; nitric acid, on the other hand, appears to decompose it.

Pepsin and Propepsin.

According to Dr. Podwissotzky (*Pfluger's Archiv*, xxix., 62) the gastric mucous membrane of neither herbivorous nor carnivorous animals yields much pepsin to glycerine if treated immediately after the death of the animal. But if it be kept in a warm place for twenty-four hours, and be then free from putrefaction, it will yield a much larger quantity. It has been stated that glycerine takes up from the membrane nothing except pepsine, but Dr. Podwissotzky finds that it dissolves also a certain amount of pepsine precursor, or "propepsine." After the mucous membrane has been exhausted with glycerine it will yield a further quantity of pepsine to hydrochloric acid, or a mixture of hydrochloric acid and glycerine; it is therefore inferred that it originally contains two forms of "propepsine," one soluble in glycerine and the other insoluble. As bearing upon the conditions under which "propepsine" is converted into pepsine it is interesting to learn that oxygen appears to favour the change, since more pepsine is formed in a gastric mucous membrane exposed to oxygen than in one exposed to atmospheric air; hydrogen and carbonic acid, on the other hand, do not appear to exercise any influence on the change. According to another observation made by Von Herzer on a patient having a fistulous opening into the stomach (*Med. Press and Circ.*, Jan. 12, p, 33) little pepsine is present in a fasting stomach in the morning, but there is plenty of "propepsine."

Pancreatic Extract.

In an interesting paper upon the action of the digestive ferments upon fodder (*Zeit. f. physiol. Chemie*, xi., 209), Herr Stutzer incidentally gives a process for the preparation of a very active pancreatic extract. It consists in chopping up finely a bullock's pancreas, previously freed from fat, triturating it with sand and exposing it to the air for twenty-four to thirty-six hours. It is next rubbed up with lime water and glycerine (sp. gr. 1·23), in the proportion of two litres of each for every kilogram of minced pancreas and allowed to macerate from four to six days with occasional stirring, next pressed and the liquor run rapidly through a loose filtering medium. An extract prepared in this way gave maximum results upon the addition of three times its volume of water containing sodium chloride equal to 0·25 per cent. of the weight of the extract.

Horseflesh and Beef.

Being called upon to determine whether it is practicable to distinguish by any ordinary method of examination between horseflesh and beef, Dr. James Bell, of the Inland Revenue Laboratory, instituted a series of experiments to test methods that have been recommended, especially those which are relied upon by the Inspector of Slaughter Houses in Paris. These depend upon purely physical and anatomical characters, such as the colour, odour, consistence and "cut" of the flesh, the occurrence of fat and the appearance of the muscular bundles; but Dr. Bell came to the conclusion that they fail to reveal such sharply defined differences as would allow of either kind of flesh being positively identified and distinguished from the other. But in some comparative experiments with the respective fats it was found (*Chem. News*, Jan. 14, p. 15) that the fat of horseflesh from any part melts at 70° F., forming a clear oil, whilst the melting points of beef fat varied between 110° and 116° F. There was also a differ-

ence noticed in the specific gravities, that of horse fat at 100° F. varying between 908·4 and 908·8, whilst that of beef fat, taken at 120° F., and calculated back to the same temperature varied between 903·6 and 904. The fat of horseflesh, like that of beef or mutton, was found to be free from any of the soluble fatty acids.

Water Infection.

The volunteer reports on the London Water Supply, presented by Messrs. Crookes, Odling and Tidy, continue to contain interesting information as to the probable extent to which water may become contaminated with the *Bacillus anthracis*. The previous experiments reported upon were made with water intended for supply for domestic use, but those referred to in their report for last month were made with running water taken from the Thames or the Cherwell. Twenty samples, purposely infected with the organism, were within half an hour of their infection added to tubes of sterilized culture fluid and submitted to incubation. In eighteen of these tubes no growth of the bacillus whatever took place, whilst in the other nine the pathogenic growth seemed more or less attenuated by the various other growths accompanying it. The reporters consider this result quite in accord with the conclusion come to by other investigators, that in the struggle for existence the microbes proper to running water outgrow and starve out the morbific form.

Teleotherapeutics.

A further contribution to the history of the extraordinary method of treating disease with drugs not in contact with the patient (see before, p. 265) has appeared in the shape of a report of some experiments made by M. Voisin on hysterical patients in the Salpêtrière Hospital, Paris (*Brit. Med. Journ.*, Jan. 1, p. 37). The experiments are described as having been made with remedies enclosed in corked and sealed opaque bottles, M. Voison being ignorant of the contents and not uttering a word in the patients' presence. The patients having been thrown into a lethargic, somnolent or cataleptic state, as long as the conditions described were maintained no result was obtained; but it is alleged that if the name of a drug of which the effects are well known, or the effects of any medicament whatever, were mentioned, the hypnotized patient immediately manifested the physiological effects of the remedy. This result, it is explained, was due partly to conscious and partly to unconscious "suggestion." It will be seen, however, that it comes far short of what on a former occasion was alleged to have been observed.

Mutisia Viciæfolia.

Dr. Sacc, of Cocahamba, reports (*Archives de Pharmacie*, Jan., p. 11) some cases of successful treatment of phthisis by means of the seeds of *Mutisia viciæfolia*, a composite plant, native of Bolivia. It is stated that the plant has long been held in repute by the Indians for the cure of phthisis and diseases of the respiratory tracts, but the identity of the remedy has been kept a secret, and considerable difficulty has been experienced in getting a supply of the seeds.

Cannabis Indica in Headache.

Cannabis indica is recommended by Dr. S. Mackenzie as being very useful in headaches of a continuous or chronic character (*Brit. Med. Journ.*, Jan 15, p. 98). He has used the extract with success in doses of half a grain night and morning, gradually increased to two grains at night and one and a half in the morning.

Pulsatilla in Orchitis.

Pulsatilla is spoken highly of in the same Journal (p. 111) by Mr. Gerard Smith as a valuable remedy in acute orchitis and epididymitis, the relief given in such cases being so rapid that it is unnecessary to employ morphine to subdue the pain, the heat and swelling subsiding more rapidly than under any other drug.

Jaborandi as a Galactagogue.

Some careful experiments made by Mr. Chéron have proved that the galactagogue properties ascribed to jaborandi are well founded, and that in order to produce this action the drug must be given in smaller doses than are necessary to cause salivation and diaphoresis. The dose used with success was 5 centigrammes of nitrate of pilocarpine, injected subtaneously as soon as the milk became scanty and repeated every day. From three to twelve injections proved successful, according to the time that the scantiness of secretion had lasted. No ill effects, either to the nurse or to the child, followed its use.

Terpine in Neuralgia.

In a paper recently read before the Société Médico-pratique, Dr. Ducroux recommends the use of terpine in some forms of neuralgia. He has given it in doses of 60 centigrams in three pills to be taken between meals (*Brit. Med. Journ.*, Jan. 8., p. 79).

Scopoleine.

The new mydriatic, scopoleine, obtained from Japanese belladonna root, is spoken highly of by Mr. H. P. Dunn (*Brit. Med. Journ.*, Jan. 8, p. 62). He prefers it to atropine in the treatment of keratitis, corneal ulcers and iritis. When both atropine and eserine have failed in troublesome corneal ulcers, the use of scopoleine has been attended with success. Although he has used it in many cases he has not in any one of them seen irritation resulting from its use. He believes that in addition to its mydriatic action, it possesses some control over the vascular supply of the eyes. The strength of the solution used by Mr. Dunn is one grain to the ounce.

Aconite and Belladonna Poisoning.

A case of poisoning from taking a dose of aconite and belladonna liniment is recorded in the *British Medical Journal* (Jan. 8, p. 62), in which recovery took place after the subcutaneous injection of apomorphia, and subsequently of large doses of ether, and the application of the interrupted current to the vagus nerve. In this case the power of swallowing was lost for some time, so that subcutaneous injections had to be resorted to, and ether was injected in this way to the extent of 120 minims.

Composition of Starch.

M. Em. Bourquelot, who has made a series of experiments as to the action of saliva as well as of water alone upon starch grains, at different temperatures and during varied periods of digestion, has arrived at the conclusion that the grains are not composed solely of amylose and granulose but of a larger number of carbohydrates (*Comptes Rendus*, civ., p. 179).

Chinese Cantharides.

Two Chinese insects have lately been shown at the London drug sales as cantharides; one of them is *Lytta Gorhami*, which is likely to contain some cantharidin and is at present under investigation, and the other belongs to a group of insects which are not remarkable for vesicating properties. It is the *Huechys sanguineus*, of the family *Cicadidæ*, of the order *Hemiptera*. This insect, which is remarkable

for its vermilion-coloured body, has the odour of cantharides, but it is not known whether it really possesses any vesicating property, although it is said to possess in China a reputation as a blistering agent.

Digitalis and Jalap in India.

According to the last report of the Botanical Gardens at Saharunpore, experiments are being made with the view of supplying Indian-grown digitalis to the Bengal Medical Department. Hitherto, although the plant has existed in the hill gardens for several years, its cultivation has not been a success, the seedlings dying off during the first rainy season after being planted in the open ground. The seeds have, however, been sown in the Arnigadh Garden in the open ground, and appear likely to succeed. About 15,000 plants would be annually needed for the production of sufficient leaves for the requirements of the Bengal Medical Department. The cultivation of jalap at Arnigadh appears also to be a success; the crop of tubers in 1885 weighed 1 maund 9 seers, and in 1886 2 maunds 10 seers, and would probably have been more but that the crop was attacked by porcupines, which suddenly displayed a taste for the tubers. It is not intended, however, to supply the medical department until three or four times the present quantity of tubers are in hand. Until lately belladonna has not become acclimatized at these gardens. Last season, however, some seedlings shot up to a height of four or five feet and were plentifully furnished with leaves, and it is hoped that this may prove a permanent variety suitable to the climate. The drugs supplied to the various Government medical depôts at Calcutta, Bombay, Madras, Allahabad, and Meean Mir, during 1885–6 are given in the the report as follows:—Extract hyoscyamus, 268 lbs. 10 ozs.; henbane leaves dried, 227 lbs.; extract of taraxacum, 192 lbs. 3 ozs.; dandelion roots, 450 lbs.; kamala, 40 lbs.; and colocynth fruit, 150½ lbs.

Ipecacuanha in India.

In a recent number of *Nature* (Jan. 6, p. 227), the Director of Kew Gardens calls attention to the curious fact that at Darjeeling, where ipecacuanha cultivation was attempted some years ago with plants derived from the Botanic Gardens at Kew and Edinburgh, the plants from Edinburgh have gradually died out, whilst nearly all the Kew plants lived. The latter had rougher leaves than the Edinburgh variety, and were less vigorous when growing under glass, and evidently formed a distinct physiological variety. In a letter read at the last meeting of the Edinburgh Botanical Society the cinchonas planted in the Shiri Highlands, in East Africa, are reported by Mr. J. Buchanan to be in a flourishing condition.

Calophyllum Inophyllum Leaves.

In the leaves of *Calophyllum inophyllum* there are present between the parallel lateral veins of the leaves laticiferous canals, which are in communication with the lateral veins on either side by means of spiral vessels, a bundle of which accompanies the canal in its whole length, and sends off ramifications to the veins. These have been hitherto supposed to carry water, but M. Trecul (*Comptes Rendus*, civ., p. 31) states his belief that, as they contain milky juice of the same brownish colour as that in the canals, they serve as a means of communication by which the secretions of the plant are distributed to the woody tissue

Taraxacum.

Some interesting pharmacognostical notes are given by Professor J. Schrenk in the *American Druggist* for January. Speaking of taraxacum he points out that it is generally stated that the root contains a central wood cylinder without any pith, but in a very large number of roots taken from various commercial sources, he has found a distinct pith. From ten to fifteen fibrovascular bundles surrounded by parenchymatous tissue include the pith, the diameter of which in some instances exceeds the thickness of the woody zone. In other respects the roots examined had the normal structure.

Veratrum Viride.

Veratrum viride rhizome is so like that of *V. album* that Flückiger states that it is quite impossible to distinguish the root-stocks of the two species. Professor Schrenk remarks that those of *V. viride* have often a decidedly loose and spongy structure, but he is not certain whether this is characteristic of this species or depends upon the time at which the rhizomes were collected. The only structural difference he has noticed is that the cells of the endoderm, when cut transversely, present a lumen (or empty space) which has the form of a U in *V. viride* and of a V in *Veratrum album*.

Bee Flowers.

A correspondent of the *Gardeners' Chronicle* (Jan. 1, p. 11), writing about flowers most frequently visited by bees, remarks that *Erica carnea* is one of the early flowers much visited by these insects, whilst *Daphne Mezereum*, which has both colour and fragrance, is not a very tempting flower to them. On the other hand, the blossoms of currants, raspberries, and gooseberries, although unattractive as regards colour, divert the attention of bees from brighter flowers in their neighbourhood. He remarks that sweet alyssum and seakale, although apparently tempting flowers, are passed over unvisited by bees.

Australian Wattles.

Baron von Mueller, the author of the valuable 'Eucalyptographia,' is now turning his attention to the Australian plants of the genus *Acacia*, and is about to issue a series of plates with descriptions, similar in character to those of the above-mentioned work. Under the name of wattle or mimosa bark, and Australian gum, the products of many of these trees are exported to this country. In this work Baron Mueller proposes to utilize for diagnostic purposes two characters which have hitherto not received much attention, viz., the number of the divisions in the pollen-mass and the position of the seed (*Nature*, Jan. 20, p. 282).

Tanekaha Bark.

Among other unusual drugs lately offered was the tanning bark of *Phyllocladus trichomanoides*, a New Zealand tree. The bark appeared in the brokers' lists under the name of Tanekaha bark.

Chinese Botany.

The *Journal of Botany* for this month contains an interesting account of the late Dr. Hance, the eminent botanist, whose knowledge of Chinese plants was practically unrivalled. He was frequently consulted concerning Chinese plants and drugs by the late Daniel Hanbury. His herbarium contained 22,000 different species or varieties which had all been poisoned and mounted by himself. This fine collection has been offered, under the provisions of his will, to the British Museum.

NOTE ON AN EPIDEMIC OF MICROCOCCUS PRODIGIOSUS.*

BY M. GRIMBERT.

Some time since several pieces of cooked meat were brought to the author for examination which presented a singular carmine-red coloration, and stained vividly the fingers or linen with which they came into contact. The phenomenon, it appeared, had then occurred regularly for three months. Food cooked over night had been found the next morning covered with red patches, and it then underwent rapid alteration.

Examination under the microscope revealed a quantity of very minute spherical cells, motionless, and appearing colourless in the midst of an amorphous red mass. Upon adding to the preparation solution of methylene the cells appeared very distinctly, forming considerable colonies.

A trace of the red matter was deposited upon sterilized cooked potato and placed under a moist glass. On the second day after the sowing the stains at the spots touched had broadened and assumed a rose colour, and it was easy to distinguish with the naked eye a multitude of isolated points, which blended soon into a uniform mass, extending more and more over the surface of the potato. The rose tint passed afterwards to blood red, a thick glairy layer being formed; at the same time a disagreeable odour was developed, recalling that of tainted meat. Later still the blood red gave place to a very dark, nearly black tint, and finally disappeared partially, leaving a yellowish mucosity. Sterilized milk was also sown and kept in a flask, the neck of which was closed with a plug of cotton. The sowing was effected by touching the surface of the liquid with a platinum wire charged with the substance. The following day the entire surface of the milk had taken a uniform red tint. Sowings effected upon coagulated albumen, cooked meat, and even raw meat, all behaved in a similar manner.

In order to study the colouring matter the red parts of the potato were removed and treated with 95° alcohol. After some days the alcoholic solution, which had taken a magnificent carmine-red colour, was filtered and evaporated. The product of evaporation treated with carbon bisulphide left a yellowish insoluble extractive-like residue, soluble in water and in alcohol. The colouring matter removed by carbon bisulphide was insoluble in cold water, slightly soluble in boiling water, and very soluble in alcohol, ether, chloroform, carbon bisulphide, benzine, oil of turpentine, amylic alcohol, acetic acid, and fats. The addition of an acid intensified its colour; alkalies caused it to assume a dirty yellow tint, but acids restored the original colour. Upon shaking with ether an acetic acid solution that had thus been discoloured by ammonia or baryta water, decanting and acidifying the ethereal solution, it became of a red colour; a reaction analogous to that of fuchsine. When amylic alcohol was used instead of ether the red colour was produced without the addition of an acid. Chlorine destroyed the red colour; sulphurous acid was without action upon it. A spectroscopic examination of the alcoholic solution showed a well-marked absorption band between lines D and E, another fainter band in the neighbourhood of line *b*, and then the gradual extinction of the other colours to violet. This spectrum approximates closely to that of an alcoholic solution of fuchsine of a similar degree of concentration.

The form of the cells, their small dimensions and mode of propagation in potatoes, milk and meat, the reactions of the colouring matter and its absorption spectrum, all point distinctly to the *Micrococcus prodigiosus*, as described by Erdmann, Cohn, Schroeter and Ehrenberg.

The epidemic ceased suddenly on the day after the meat was brought to the author for examination, the disappearance coinciding with a considerable fall in the temperature. Since then it has not been observed, although no precautions have been taken to prevent its return.

* *Journal de Pharmacie*, December, p. 547.

Referring to this communication a correspondent of the *Pharmaceutische Zeitung* says that the description corresponds in every detail with a case of the occurrence of this fungus which was brought under his notice in Cologne in 1883, when he also separated by similar methods the colouring matter resembling fuchsine.

PROXIMATE ANALYSIS OF STIGMATA MAYDIS.*

BY C. J. RADEMAKER, M.D., AND JOHN L. FISCHER, PH.G.

Fifty grams of stigmata maydis were treated with petroleum spirit at a boiling point below 112° F. This extracted 5·25 per cent. of a light yellow fixed oil which saponified readily with caustic potash, and solidified at a temperature of 50° F. No volatile oil was found in the petroleum extract, nor was any obtained by distillation. The oil was soluble in chloroform, ether and petroleum spirit, but was insoluble in alcohol. The action of nitrous acid upon this oil produced no change of colour, but the oil solidified in a few hours.

The drug after drying was next exhausted with ether; this extracted 2·25 per cent. of solid matter, one per cent. of it being soluble in water. This aqueous solution had an acid reaction. The other 1·25 per cent. proved to be resin and chlorophyll. Upon evaporating the aqueous solution to dryness, redissolving the residue in ether and allowing the ether to evaporate spontaneously, a colourless acid crystalline principle was left.

The original drug after being dried was then treated with absolute alcohol, which extracted 3·25 per cent. of solid matter; 2 per cent. of this proved to be resin and colouring matter, the other 1·25 per cent. proved to be an acid, identical with the acid found in the ether extract.

This acid was first discovered by Dr. Vautier (*Arch. Méd. Belges*), and he named it *maizenic acid*. It is freely soluble in water, ether and alcohol, but insoluble in petroleum spirit. It decomposes the alkaline carbonates, and its salts are crystallizable, the potash salt crystallizing in rhomboidal prisms.

To water the drug yielded 19·50 per cent. of solid matter. This was redissolved in water and then made alkaline by caustic potash. The solution was then successively treated with ether, chloroform and petroleum spirit, but no crystalline principle was obtained. The aqueous extract consists principally of sugar, gum and extractive matter.

That portion of the drug that was insoluble in water, gave to a 2 per cent. solution of caustic soda, 3·50 per cent. of solid matter, consisting of albuminoids, phlobaphene, etc., and to a 2 per cent. solution of hydrochloric acid, the drug gave 5·50 per cent. of salts with a small amount of extractive matter.

Upon bleaching the final residue, washing and drying, 37 per cent. of cellulose was obtained.

Another portion of the drug yielded 20 per cent. of moisture. The following shows the amount of the most important constituents:—

Fixed oil	5·25	petroleum spirit extr.
Resin, crystalline principle and chlorophyll . . .	2·25	ether extract.
Resin, crystalline principle and chlorophyll . . .	3·25	alcohol extract.
Sugar, gum and extractive	19·50	water extract.
Albuminoids, phlobaphene, etc.	3·50	from alkaline solution.
Salts and extractive . .	5·50	from acid solution.
Cellulose	37·00	
Water	20·00	
	96·25	

* From the *American Journal of Pharmacy*.

The Pharmaceutical Journal.

SATURDAY, JANUARY 29, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PHARMACISTS' MAINTENANCE OF PHARMACOPŒIA STANDARDS.

IT will be seen from the correspondence in the present number of the Journal that the opinions we ventured to express as to the general application of a Pharmacopœia standard for medicinal preparations have met with some dissent. We think this has arisen to a great extent from a philanthropic regard for the public safety being allowed to eclipse the consideration of what is essential for enabling the pharmacist to establish and maintain the character of being a trustworthy source from which to obtain medicinal preparations. It is well that, from both points of view, pharmacists should everywhere resolve, as the Sheffield pharmacists have done, to be bound by the precepts and directions of the British Pharmacopœia, but we fail to perceive that it is their business to endeavour to make that authority the standard for regulating transactions which are outside the scope of their business. The pharmacist can legitimately and appropriately manifest his solicitude for the public safety by the care which he exercises in the preparation of medicines, by scrupulously testing and verifying the quality of the articles which he obtains from wholesale houses, and by so doing he will give practical effect to the special qualifications which really place him out of reach of the competition of other traders. This view of the matter does not appear to have received sufficient attention, and it seems hardly to have been perceived that if the grocer is required to exercise the same kind of control over the quality of such drugs and medicinal preparations as he may undertake to sell, the distinction between the two, so far as the safety of the public is concerned, will be done away with. Such a result would not lessen competition.

The fact that the tincture of opium case was not one of outside competition was by no means lost sight of, but it was unnecessary to refer to that circumstance as affecting the decision of the stipendiary magistrate. So far as can be gathered from the report of the case, it does not appear that British Pharmacopœia tincture of opium was demanded by the purchaser, and although the defendant pleaded that he purchased the article as the tincture of the British Pharmacopœia, he had evidently omitted to carry out that personal verification of its quality and contents which would have constituted the most effectual safeguard for the public, and, at the same time, the best protection of his own interests. If pharmacists will allow the exercise of these functions, which so specially appertain to them, to devolve upon the public analyst, it cannot be wondered at if they consequently suffer inconvenience and loss of *prestige*. It is not sufficient to have implicit faith in the supplies of wholesale houses, however much they may be deserving of confidence, for it is the personal guarantee of the pharmacist for every article passing through his hands which can alone place him in a position of greater esteem with the public than the grocer or the oilman. In the case now referred to, a simple examination of the tincture, such as was made by the Sheffield public analyst, would have disclosed its defects, and have furnished sufficient reason for its being returned to the wholesale house that supplied it. The necessity of directing attention to this matter was very justly insisted upon by Mr. DUNCAN in the inaugural address to the Edinburgh Chemists' Assistants and Apprentices' Association last October, and it has been illustrated at the meeting of that Association, reported in the present number of the Journal at page 619.

Another important practical commentary upon the remarks offered in this Journal last week as to the professional functions of the pharmacist has been furnished by the disclosure that has now been made in connection with another of the Sheffield prosecutions. Notwithstanding the statement in the report of the Executive Committee of the Chemists and Druggists' Trade Association that it had ordered the defence of a member against whom proceedings were commenced for having improperly dispensed a prescription containing quinine and iron citrate, it now turns out that there was no ground for disputing the public analyst's certificate that, though the prescription had been correctly dispensed as regards the quantities of the ingredients ordered, the quinine and iron citrate employed was decidedly inferior to that of the British Pharmacopœia, since it contained only 11·8 per cent. quinine instead of 15 per cent. How such an erroneous result can have been concurrently arrived at by three chemists it is difficult to understand, but that is of comparatively little moment as regards the importance of a personal verification of the character of all such articles. Without that security accuracy in dispensing will have but little worth, and both the patient and the dispenser may suffer. Probably in this case also the preparation was purchased as of B.P. standard, the guarantee of the wholesale house being accepted as sufficient, and this is precisely the point where opportunity was afforded for all the mischief that has arisen. The remedy for it would have been the simple precautionary measure of testing the preparation before it was used and then, as in the case of the tincture of opium, it could have been re-

turned as not coming up to the standard required. This simple proceeding would have been a complete protection of the pharmacist against the intervention of the public analyst, and unless recourse is had to that protection which is within the power of every pharmacist to supply himself with, there will be little reasonable ground for complaining of the hardship and inconvenience of prosecutions under the Food and Drugs Act.

COCAINE HYDROCHLORATE.

In resuming this month the issue of the very interesting series of publications under the title of "Ephemeris," the subject of cocaine hydrochlorate is dealt with by Dr. Squibb at some considerable length. For the extraction of the alkaloid from the coca leaves percolation with dilute sulphuric acid is considered the best method, the process being repeated until a very dense and concentrated extract is obtained. This is mixed with carbonate of soda in excess, and well shaken with kerosene oil, which dissolves the liberated alkaloid in a state comparatively free from colouring matter and other substances. It is then washed out of the kerosene by means of acidulated water, and again precipitated by carbonate of soda in the presence of ether. From the ether solution it is finally washed out by dilute hydrochloric acid in fractions, the first fractions removing most of the remaining colouring matter. The fractions sufficiently free from colour are then evaporated at a low temperature in shallow pans, and while the salt is crystallizing it is constantly stirred until a dry residue is obtained, which Dr. Squibb considers to be very nearly pure anhydrous hydrochlorate. When this product is dissolved to near saturation in warm and strong alcohol the solution will after some days yield a crop of distinct and compact crystals. But by the greatest care, however, there will remain in solution from 25 to 30 per cent. of the salt that is in an uncrystallizable condition, or at least uncrystallizable from alcohol. On evaporating the alcohol slowly a sticky amorphous mass is obtained, with some very small crystals distributed through it, and after exposure to the atmosphere for a week or two it spontaneously crystallizes throughout; but the crystals are minute and powdery, and very unlike the first crop in external characters. According to this account, the accuracy of which will be recognized by those who have operated upon this salt, there appears to be considerable reason for suspecting the presence of two different substances. Chemically, and in the reactions with chemical tests, Dr. Squibb considers that this is really the case, but he considers that the main difference consists in the difficulty of crystallizing the one portion. Therapeutically and physiologically, however, Dr. Squibb does not find that there is any difference between these two portions of the product obtained in the manner described above. No doubt much of the cocaine hydrochlorate hitherto used has been made in this way, and it is only within a comparatively recent period that the large compact crystals have been obtainable, and in America only one manufacturer offers to supply them at present. It becomes, however, a very important question to determine whether the difference in the efficacy of these two portions of the gross product is so slight as Dr. Squibb describes it to be. He points out in reference to this question that all the best work of the salt as an anæsthetic was done before this more perfectly crystallized material was obtainable, and according to his statement the use of the better crystallized material has not been attended with any obvious therapeutic advantage.

From the examination of nine different makes of cocaine hydrochlorate Dr. Squibb comes to the conclusion that the difference between them is chiefly one of physical condition. He thinks that, as a matter of fact, it is very doubtful whether the amorphous salt can exist in that state for any considerable length of time, though like the alkaloid it is capable of assuming the amorphous state and retaining it for a time varying according to circumstances. The whole of the nine samples examined are referred to three distinct groups: the first comprised four that were anhydrous and had probably been made by stirring down a solution to dryness, all containing some hygroscopic moisture and decomposition product; the second comprised two brands, consisting of distinct anhydrous crystals; the third also comprised two brands, both consisting of hydrated crystalline masses of needles somewhat effloresced, and with from 6·72 to 8·62 per cent. of water of crystallization.

We are able to announce that the Calendar of the Pharmaceutical Society for 1887 is now ready, and that copies, price 1*s.* each, or free by parcels post 1*s.* 4½*d.*, may be had from the Secretary, 17, Bloomsbury Square. It may be useful to mention that this Calendar, besides lists of Members, Associates and Apprentices of the Society, and subscribers and donors to the Benevolent Fund, contains all needful information as to the examinations, as well as the various Acts of Parliament, Inland Revenue Orders, etc., that affect the business of chemists and druggists. The Registers of Pharmaceutical Chemists and Chemists and Druggists for 1887 are also in a forward condition, and will be ready for delivery in the course of a week.

* * *

The energetic Director of the Royal Gardens at Kew, Mr. W. T. Thiselton Dyer, has announced his intention to issue from time to time, as occasional publications in the pamphlet form, such notes on economic products and plants to which the attention of the Staff of the Royal Gardens may be specially drawn as shall be too detailed for insertion in the annual report. The general title is to be "Bulletin of Miscellaneous Information," and the first number has just been published by Messrs. Eyre and Spottiswoode, price 2*d.* It contains extracts from corre-

spondence respecting "teff" (*Eragrostis abyssinica*), an Abyssinian cereal of economic value, suitable for cultivation at high elevations, together with an interesting note on "Oil of Ben."

* * *

We understand that the 'Year-Book of Pharmacy' for 1886, containing the Transactions of the British Pharmaceutical Conference, and a *résumé* of the literature of pharmacy and allied sciences, is now ready for delivery to members who have paid their subscriptions. The volume is somewhat more bulky than some issued in previous years, and in the "Preface" it is said to contain a larger number of abstracts than any of its predecessors.

* * *

We learn that the result of Mr. Haydon's appeal to the Pharmaceutical Chemists and Registered Chemists and Druggists of Great Britain has been, up to the time of our going to press, one hundred and eighty-two pounds, together with numerous promises of further support.

* * *

Mr. J. A. Wanklyn puts on record that in the water of the Woodhall Spa, near Lincoln, which is known to be exceptionally rich in bromides and iodides, iodine occurs in the free state in sufficient quantity to import a brown colour of considerable depth of tint. This is proved by the formation of the blue iodide upon the addition of starch paste to the water. Further, when the water is shaken with one-twentieth of its volume of carbon bisulphide, it loses its odour and becomes colourless, whilst the carbon bisulphide acquires a pink violet colour through having dissolved out the iodine.

* * *

The Philosophical Faculty of the University of Breslau has conferred the degree of Doctor *honoris causâ* on Otto Maschke, Apotheker and Medical Assessor, on account of his services to science.

* * *

The Portuguese papers announce the death of Dr. J. Pereira Reis, formerly professor of pharmacology in the Oporto Medical School. His published works were numerous, the chief one being an edition of Albano's 'Codigo Pharmaceutico Lusitano.' He was during his life-time a liberal benefactor to various charitable institutions, and has left a portion of his fortune to found a children's hospital.

* * *

At the next meeting of the Chemical Society, on Thursday, February 3, there will be a ballot for the election of Fellows, and the following papers will be read:—"An Explanation of the Laws which govern Substitution in the case of Benzenoid Compounds," by Dr. Armstrong; and "The Synthetical Formation of Closed Carbon Chains: Part II. Some Derivatives of Tetramethylene," by Dr. W. H. Perkin, Jun., and H. Coleman; Part III. "Some Derivatives of Pentamethylene," by Dr. W. H. Perkin, Jun.

* * *

The next meeting of the School of Pharmacy Students' Association will take place on Thursday, Februrary 3, when a paper will be read on "Cocoa Butter" by Mr. E. H. Barritt, and a Report on Analytical Chemistry will be given by Mr. J. G. Tingle.

* * *

A meeting of the Chemists' Assistants' Association will be held on Wednesday next, February 2, when a lecture on "The Wellers," will be delivered by Mr. C. F. Rideal.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

January 18, 25, *and* 26, 1887.

Present on each day—Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Professor Sir Douglas Maclagan was also present on behalf of the Privy Council.

MAJOR EXAMINATION.

18*th.*—*Two* candidates were examined. *Both* failed.

25*th.*—*Two* candidates were examined. *One* failed. The undermentioned passed, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Robb, David.....Ossett.

MINOR EXAMINATION.

18*th.*—*Fifteen* candidates were examined. *Nine* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Ayre, George Martin .....Edinburgh.
Bell, Joseph .....Alnwick.
Cooper, Edwin .....Lincoln.
Craig, Nicol Miller ... .Edinburgh.
Todd, Charles .....Carlisle.
Want, William Phillip .....Lee.

25*th.*—*Fifteen* candidates were examined. *Seven* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Flynn, William.....Lockerbie.
Gass, George Muncaster.....Whitehaven.
Lomax, William Henry .....Darwen.
McIver, John .....Nairn.
Mackie, George .....Peterhead.
Melvin, George.....Aberdeen.
Oglesby, Arthur .....York.
Pickering, Charles Edward ...Stockton-on-Tees.

26*th.*—*Fourteen* candidates were examined. *Nine* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Carnaby, Francis William .....Blyth.
Spencer, Charles .....Coventry.
Taylor, Wm. Chadwick Coates.Saltburn-by-Sea.
Whyte, Alexander .....Huntly.
Wilson, John .....Aberdeen.

PRELIMINARY EXAMINATION.

A meeting of the Board of Examiners for England and Wales was held on Thursday, January 27, 1887.

The undermentioned certificates were received in lieu of the Society's examination:—

Certificates of the College of Preceptors.

Garnett, Henry.....Evesham.
Tremeer, Arthur John .....Barnstaple.
Woollett, Frederick W. C.....Rye.

Certificate of the Faculty of Physicians and Surgeons of Glasgow.

Rogers, Arthur Robert .....Newmarket.

Certificate of the Incorporated Law Society.

Scott, Richard Forder.....London.

Certificates of the University of Cambridge.

Brown, Alfred .....Leicester.
Carter, Henry Lansdale .....London.
Jowett, Hooper Albert D. .....Lancaster.
Smith, Frederick .....London.
Stephens, John Richard Cook...Swindon.

Certificate of the University of Edinburgh.

Spence, Annie Y. W. .....Linlithgow.

The Report of the College of Preceptors on the examinations held on January 11, was received.

Two hundred and ninety-three candidates had presented themselves for examination, of whom *one hundred and forty-two* had failed. The following *one hundred and fifty-one* passed, and the Registrar was authorized to place their names upon the Register of Apprentices and Students :—

Adams, Herbert Samuel ... .Newbury.
Allen, James.....Wrington.
Amos, Harry Beard .....Canterbury.
Avison, Frank Schofield .....Dukinfield.
Back, Charles Thomas .....London.
Baird, William.....Kelso.
Barrett, Allen Lifton .....Hay.
Bartlett, Percy John .....London.
Bayes, James Austin .....Cardiff.
Baylis, Henry .....Redditch.
Beachell, John .....York.
Bell, Matthew .....Gateshead.
Blore, George James .....Uttoxeter.
Booth, Charles Henry.....Colchester.
Brackenbury, Edgar William...Bardney.
Briggs, Sam .....Halifax.
Burdett, Edgar.....Nottingham.
Burrell, Frederick Charles.....Midd Rasen.
Callaway, James Thomas .....London.
Cammack, Jeffrey .....London.
Cannell, Annie Elizabeth .....Wolverhampton.
Carre, Arthur Bishop .....Guernsey.
Carter, Benjamin Robert .....Hounslow.
Chalmers, Franklin.....Devizes.
Chambers, John Wm. Parsons..Derby.
Choat, Joseph Newsom .....Lynn.
Chrispin, William Foggitt .....Featherstone.
Chudleigh, Thomas Morcom ...Liskeard.
Clemitson, Joseph William ...Bishop Auckland.
Cocker, Harris .....Earlsheaton.
Colman, William .....Manchester.
Connell, John .....Kirkby Folly.
Cooper, John.....Farnsworth.
Coulthard, David.....Carlisle.
Coverdale, Robert .....Louth.
Cowley, Robert Charles .....Douglas.
Dangerfield, Walter John .....Leamington.
Daniel, John.....Dumfries.
Daniels, Joseph William.....Landport.
Darling, John .....Yarm.
Davies, John.....St. Clears.
Davies, John Lloyd.....Llanelly.
Dodd, Henry Vincent.....Slough.
Dodsworth, Robert ....Newcastle-on-Tyne.
Douglas, William.....Dalry.
Dowling, Herbert D. ... .Reading.
Ecclestone, George Thomas ...Soham.
Ellis, David ....Ellesmere.
Elphinstone, Edmond.....New Pitsligo.
Elphinstone, Joseph Lawson...Aberdeen.
Empringham, James .....Lynn.
Evans, Robert Stanley .....Dowlais.
Evans, Sem .....Kidwelly.
Fairburn, George.....Northallerton.
Francis, Austin .....Haverfordwest.
Gillies, William .....Manchester.
Green, James .....Peterborough.
Gunstone, Herbert Challiner...Oxford.
Guttridge, Gladstone .....Nottingham.
Hall, John Stratford ... .Bishop Auckland.
Halley, Daniel .....Aberdeen.
Harburn, John English .....Whitby.
Henderson, James .....Kirkcudbright.
Higgs, Andrew Badgery.....Bodmin.
Highet, Campbell.....Ayr.
Horniblow, Frederick Herbert..Worcester.
Hughes, John .....Penmaenmawr.
Hulme, Thomas ....Manchester.
Hunt, Henry James.....Broughty Ferry.
Hunter, William John .....Spilsby.
Inglis, William.....Lochmaben.
Innes, John .....Douglas.
Jackson, Charles Ernest.....Boston.
Jackson, Herbert Richardson...Bradford.
Jackson, William Oswald .....London.
Jenkins, William .....Cardiff.
Jessop, Sam .....Brighouse.
Johnston, John.....Carlisle.
Jones, Charles Edward .....Liverpool.
Jones, John Monk .....Aspull.
Jubb, Nathaniel .....Langworth.
Lawton, Henry Smith.....Birmingham.
Lemmon, Richard Haworth ...Facit.
Lewis, Claude Byers .....Carmarthen.
Little, Charles Walter .....Guernsey.
Lloyd, John Griffith .....St. Dogmaels.
Lloyd, William Morgan .....Maldon.
Lonsdale, Thomas .....Preston.
Love, James Duncan .....Ayr.
Mann, John Wing .....Spalding.
Marshall, George.....Spilsby.
Martlew, Ernest Hercules .....Southsea.
Mason, Alexander .....Perth.
Milne, Alexander.....Old Aberdeen.
Mitchell, George Alexander ...Crieff.
Morley, Benjamin M.....Norwich.
Neal, Henry Octavius.....Nottingham
Oke, Alfred John.....Little Hulton.
Paterson, Alexander .....Edinburgh.
Pearson, Benjamin .....Grange.
Peters, George Henry.....Wrexham.
Pirie, Wallace G.....Peterhead.
Playford, Hubert.....Leamington.
Popham, Henry Nicholas .....South Shields.
Prime, Thomas Fletcher.....London.
Pritchard, Thomas Henry .....Porth.
Raby, James Herbert .....Bury.
Reid, Robert.....Alloa.
Robertson, James Ambrose ...Portobello.
Robson, Francis White Hope...London.
Scott, Thomas Lamb .....Hetton-le-Hole.
Short, William John .....Portsmouth.
Shuttleworth, John Henry.....Gainsborough.
Simmonds, Frank Livings .....Reading.
Simpson, Aitken .....London.
Sinclair, Neil Crawford .....Greenock.
Slater, Thomas Sutcliffe .....Burnley.
Smith, Alfred Charles.....Newton-le-Willows.
Smith, Stanley .....Truro.
Spence, Alexander .....Linlithgow.
Spence, George.....Gateshead.
Steven, Edward .....Stirling.
Stokes, William Charles .....Weymouth.
Sturton, Frank Ainsworth .....Peterborough.
Swainson, John William.....Devonport.
Taylor, Joseph Crabtree .....Southport.
Thackrey, Frank .....Pateley Bridge.
Thomas, Dan .....Hafod.
Thomas, Frederick William ...London.
Thomas, William Jolliffe .....Brynhyfryd.
Thompson, Joseph George .....Maryport.
Thorp, Walter Thomas .....Glossop.
Tildesley, Frederick George ...Chesterfield.
Turner, John Arthur .....York.
Turtle, Howard Robert .....Chatham.
Vincent, Robert .....Nottingham.
Walker, Alfred Ernest .....Coventry.
Watkinson, William Harrison Farnworth.
Watson, Harry.....Spennymoor.
Watson, James.....Glasgow.
Watson, Lindley Arthur.....Beccles.
Wellburn, Halder.....Pickering.
Wells, William Luty .....Louth.
Wheeldon, James Pickering ...Manchester.

White, Frank .....Liverpool.
Whitelaw, Andrew .....Greenock.
Whitwell, Frederick William...Peterborough.
Wicks, Harry Gilbert.....Keswick.
Wilkes, Harry Smith .....Upton-on-Severn.
Wilson, Edward Arthur.....London.
Wood, Septimus .....Knottingley.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	10	5	5	Inverness	2	0	2
Birmingham	12	6	6	Jersey	1	0	1
Brighton	2	0	2	Lancaster	5	1	4
Bristol	5	2	3	Leeds	15	7	8
Cambridge	1	0	1	Lincoln	10	8	2
Canterbury	2	1	1	Liverpool	17	8	9
Cardiff	9	5	4	London	30	18	12
Carlisle	11	6	5	Manchester	27	11	16
Carmarthen	12	6	6	Newcastle	11	8	3
Carnarvon	5	1	4	Norwich	8	5	3
Cheltenham	2	1	1	Nottingham	12	7	5
Darlington	10	3	7	Oxford	3	3	0
Douglas	2	2	0	Peterborough	9	5	4
Dundee	6	2	4	Sheffield	3	1	2
Edinburgh	12	6	6	Shrewsbury	5	1	4
Exeter	4	0	4	Southampton	4	3	1
Glasgow	9	7	2	Truro	5	4	1
Guernsey	3	2	1	Worcester	2	2	0
Hull	1	0	1	York	6	4	2

The questions set for examination were as follows :—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. (*For all Candidates.*) *Translate into Latin* :—

1. Very many men give the greatest praise to Cæsar.
2. We wish that the enemy may be conquered.
3. The camp of Hannibal was under the walls of Rome.
4. We know that the soul is immortal.
5. When these things were done, Cæsar ordered his soldiers to begin the battle.

II. Translate into English either A. (Cæsar) or B. (Virgil).

(*Candidates must not attempt both authors.*)

A. Cæsar.

1. Tum demum Liscus, oratione Cæsaris adductus, quod antea *tacuerat, proponit:* Esse nonnullos, quorum auctoritas apud plebem plurimum *valeat*, qui privatim plus possint, quam ipsi magistratus. Hos seditiosa atque improba oratione multitudinem deterrere, ne frumentum *conferant*; quod præstare *debeat*, si jam principatum Galliæ obtinere non *possent*, Gallorum, quam Romanorum imperia perferre; neque dubitare debeant, quin si Helvetios superaverint Romani, una cum reliqua Gallia Aeduis libertatem sint erepturi.

2. Caius Valerius Procillus, quum a custodibus in fuga trinis catenis vinctus traheretur, in ipsum Cæsarem, hostes equitatu persequentem, incidit. Quæ quidem res Cæsari non minorem quam ipsa victoria voluptatem attulit; quod hominem honestissimum provinciæ Galliæ, suum familiarem et hospitem, ereptum e manibus hostium, sibi restitutum videbat : neque ejus calamitate, de tanta voluptate et gratulatione, quidquam fortuna diminuerat.

III. *Grammatical Questions.*

(For those Candidates only who take Cæsar.)

1. Decline in the singular *hominem honestissimum*, and in the plural *trinis catenis* (Par. 2).
2. Give the principal parts of the verbs in italics (Par. 1).
3. Parse fully *persequentem, minorem, quod, sibi* (Par. 2).
4. Write the Latin numerals (cardinal and ordinal) from *one* to *ten*, and decline *tres*.

B. Virgil.

1. Æolus hæc contra : Tuus, o regina, quid optes
Explorare labor ; mihi jussa *capessere* fas est.
Tu mihi quodcumque hoc regni, tu sceptra Jovemque
Concilias ; tu *das* epulis accumbere Divum,
Nimborumque facis tempestatumque potentem.
Hæc ubi dicta, cavum conversa cuspide montem
Impulit in latus; ac venti, velut agmine facto,
Qua data porta, *ruunt*, et terras turbine *perflant*.

2. Hæc dum Dardanio Æneæ miranda videntur;
Dum stupet, obtutuque hæret defixus in uno,
Regina ad templum forma pulcherrima Dido
Incessit, magna juvenum stipante caterva.
Qualis in Eurotæ ripis, aut per juga Cynthi,
Exercet Diana choros, quam mille secutæ
Hinc atque hinc glomerantur Oreades: illa pharetram
Fert humero, gradiensque deas supereminet omnes ;
Latonæ tacitum pertentant gaudia pectus :
Talis erat Dido, talem se læta ferebat
Per medios, instans operi regnisque futuris.

III. *Grammatical Questions.*

(For those Candidates only who take Virgil.)

1. Decline in the singular *obtutu uno*, and in the plural *deas omnes* (Par. 2).
2. Give the principal parts of the verbs in italics (Par. 1).
3. Parse fully *defixus, quam, hinc, tacitum* (Par. 2).
4. Write the Latin numerals (cardinal and ordinal) from *one* to *ten*, and decline *tres*.

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*)

(N.B.—The working of the examples, as well as the answers, must be written out in full.)

1. Divide 28 tons 4 cwt. 3 qrs. into 36 equal portions, and find the value of one of them at £7 10*s.* 8*d.* per cwt.
2. A merchant buys 32016 tons of iron; he sells half of it at cost price, half of the remainder at a profit of $\frac{1}{2}d.$ a lb., and the rest at a profit of $\frac{1}{4}d.$ a lb.; find his gain.
3. Reduce to its simplest form—

$$\tfrac{7}{27} \text{ of } \frac{3}{6\frac{1}{15}} \text{ of } 2\tfrac{3}{5} - \tfrac{1}{6}\left(2\tfrac{1}{7} - \frac{1}{3\frac{1}{3}} \text{ of } \tfrac{15}{7}\right).$$

4. What decimal of 14 cwt. 1 qr. 20 lb. is 6 cwt. 1 qr. 7 lb?
5. Calculate the rent of 38 acres 2 roods 16 perches, at 17·2083 the acre.
6. Write out the Metric Table of Length. If with 53·46 kilog. of thread a man can weave 462 mètres of linen, 1·14 mètre broad, how many mètres of linen, ·95 mètre broad, can he weave with 37·8 kilog. of thread of the same quality?
7. If by selling a liquid at 15*s.* a gallon I lose 6 per cent., at what price must I sell it to gain $17\frac{1}{2}$ per cent?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

1. Analyse the following sentence:—
"I sat upon a promontory
And heard a mermaid on a dolphin's back,
Uttering such dulcet and harmonious breath,
That the rude sea grew civil at her song."
2. Parse the following sentence,—"Let honour be to us as strong an obligation as necessity is to others."
3. Correct the following sentences, giving your reasons :—
(i.) We can easier sing than play.
(ii.) Are either of these books yours?
(iii.) He is not only famous for his running, but his jumping.
4. In the following passage supply the necessary capital letters, and put in the stops and inverted commas where

necessary:—the house of commons was all of one mind this is no time to be counting cost said honest birch who well remembered the way in which oliver had made war on the irish are those brave fellows in londonderry to be deserted if we lose them will not all the world cry shame upon us a boom across the river why have we not cut the boom in pieces are our brethren to perish almost in sight of england within a few hours voyage of our shores howe the most vehement man of one party declared that the hearts of the people were set on ireland.

5. Give a short account of a Sovereign, Statesman, or Writer of the Tudor period; or, Give a brief description of some scientific invention of the present century.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The monthly general meeting was held at the Society's Lecture Room, Norfolk Row, on Wednesday evening the 19th inst. The chair was occupied by the President (Mr. Newsholme), and there was a good attendance.

The minutes of the last monthly meeting and of the special meeting were read and confirmed.

A donation to the Society's Museum from Mr. John Clark, West Street, was announced, consisting of an excellent herbarium; also fine specimens of crystals, under glass shades. On the proposition of the President, a vote of thanks to the donor was unanimously passed.

The following lecture was then delivered on—

Some Analytical Facts and Processes of Interest to Pharmacists.

BY ALFRED H. ALLEN, F.I.C., F.C.S.,
President of the Society of Public Analysts.

When asked by your worthy President to give a lecture before this Society, it occurred to me that it might be of interest if I were to discuss some of the simpler analytical processes which may readily be employed for testing certain of the articles that pharmacists are in the habit of selling. I suppose it is a fact that certain pharmaceutical preparations, such as tinctures, for instance, are rapidly becoming the product of a limited number of wholesale houses, and that the number of preparations which the retail pharmacist himself prepares is constantly diminishing. This being the case, the retailer is evidently becoming more and more dependent on the care and integrity of the manufacturer and wholesale dealer, and hence it is the more necessary that he should accustom himself to test certain articles with which he is supplied, which, from the circumstances of their manufacture, are liable to vary materially in purity or strength. In saying this, I am in no way arguing that the retail pharmacist should attempt to test every preparation that he buys, nor is there any need that he should do so, as in the event of his being called to account in any instance, the law upholds that it is sufficient defence if he can prove that he bought the article in the state in which he sold it, under a written guarantee from the wholesale dealer; but for his own sake a pharmacist will often desire to acquaint himself with the preparations he buys, and, fortunately, it is possible to do this in many cases without much expenditure of time, or use of very complicated methods or elaborate appliances. Of course I do not propose this evening to touch on all the various pharmaceutical preparations which admit of being chemically tested; as a rule, the tests given in the Pharmacopœia are sufficient for the purpose, and are possessed of reasonable simplicity and accuracy. My object is rather to call your attention to certain points with which some at least of those present are probably unfamiliar.

Of all simple methods of ascertaining the strength of liquid preparations the simple method of taking the specific gravity is perhaps that most widely applicable. By defining the specific gravity of mineral acids, and such preparations as solution of acetate of ammonia and others, the Pharmacopœia furnishes a sufficient test in most cases: but no special method of ascertaining the specific gravity is laid down, the operator being left to employ at his discretion a hydrometer, specific gravity bottle, or, as I have known to be done, a 10-ounce measure.

I have of late found the familiar hydrometer or gravity bottle might be conveniently replaced by the piece of apparatus known as the Westphal hydrostatic balance. It has the advantage that while densities can be ascertained by means of it with all desirable accuracy the results are obtained almost as expeditiously as by employing a hydrometer. Further, the one instrument is suited for determining the density of all liquids, from petroleum ether to chloroform and strong sulphuric acid. The manipulation, as you see, is extremely simple, and the direct reading of the little riders which serve as weights gives without calculation the specific gravity of the liquid under examination. By substituting a piece of stout glass rod, having a volume of exactly 5 c.c., for the thermometer-plummet sold with the apparatus, I have found the arrangement valuable for the determination of the density of substances at the boiling point of water, By means of this arrangement the specific gravity of solid fats and waxes can be directly compared with those of the fluid oils, and some novel and interesting facts become apparent. Thus, though solid waxes are denser than solid fats and fluid oils, when all are compared in a molten state at the temperature of boiling water the waxes are found to be the lightest. The apparatus, consisting of a jacket in which water can be kept constantly boiling, enables determinations of densities at the boiling point by the Westphal balance to be very readily effected.

Another piece of apparatus, which I was the first to introduce to the notice of pharmacists, and which is capable of a limited number of very useful applications, is the nitrometer. On a previous occasion I explained the use of the instrument for assaying the spirit of nitrous ether, and since that time the process devised by me has become well known to pharmacists, and has been adopted in the British Pharmacopœia as one of the alternative methods of assaying this preparation. The same method is applicable to the assay of nitrite of amyl, provided this be previously dissolved in rectified spirit so as to dilute it appropriately; and nitrite of sodium, now of little practical interest to pharmacists, can also be assayed by means of it. A new application for the nitrometer has recently been pointed out by Mr. Gravill, who employs it for the assay of the aromatic spirit of ammonia. When prepared according to the directions given in the new Pharmacopœia, the aromatic spirit of ammonia should contain a perfectly definite amount of ammonium carbonate, and this can be readily ascertained by treating 5 c.c. of the sample in the nitrometer over mercury with dilute hydrochloric acid, measuring the carbonic acid gas evolved, and adding 3·5 c.c. to the measure obtained, as a correction for the gas which remains dissolved in the liquid. According to Mr. Gravill, when thus treated the aromatic spirit of ammonia should, with the correction, yield 36 c.c. of gas; but Mr. A. C. Abraham, who has also employed the process, considers 32 c.c. to be a fairer volume to expect. These figures are very different from some of those obtained by these operators from commercial samples. Another application of the nitrometer is to the assay of peroxide of hydrogen, a preparation a good deal used in Sheffield, and which, being somewhat unstable, is often very far from being of professed quality. The strength of peroxide of hydrogen is usually expressed in volumes of available oxygen which it contains, the preparation being sold as five volumes, ten volumes, or twenty volumes, according to circumstances. The strength can be ascertained very

readily by filling a nitrometer with a concentrated solution of sulphate of sodium, which for this purpose is preferable to brine; 1 c.c. of the sample to be tested is then introduced through the tap, and this is followed by a strong solution of potassium permanganate which has been previously acidulated with sulphuric acid. The reaction occurs very promptly, oxygen gas being freely evolved, and the permanent coloration of the contents of the tube suffices to show that an excess of the permanganate has been employed. Only one half of the volume of gas, however, comes from the peroxide of hydrogen, the remainder having its origin in the potassium permanganate employed: therefore 1 c.c. of a sample of hydrogen, described as of ten volume strength, ought to give 20 c.c. of oxygen in the nitrometer.

Another application of the nitrometer, which may occasionally be of interest to pharmacists, is for the estimation of urea in urine. For this purpose the tube is filled with brine and 2 c.c. of the sample introduced through the tap. This is followed by 10 c.c. of the usual solution of bromine in caustic soda. Before the bromized soda has time to sink through the brine it comes in contact with the urine, and the great bulk of the nitrogen gas is liberated. By now placing a clip on the india-rubber connecting-tube, and agitating the nitrometer tube vigorously, the reaction is completed, and the volume of gas may be read off. Not unfrequently, the reading is delayed by the existence of froth on the surface of the liquid in the closed tube, but this may be instantaneously got rid of by introducing a few drops of alcohol through the tap. A preferable method of employing the nitrometer for assaying urine is to bring the bromized soda and urine into contact with each other in a small flask fitted with a perforated cork, and connected by narrow india-rubber tubing with the cap of the nitrometer filled with water. From 2 to 5 c.c. of urine will be found to furnish a convenient volume of gas for measurement in the nitrometer. Each centimetre of nitrogen gas evolved represents 0·0029 gram of urea in the urine operated on.

The use of volumetric solutions for assaying certain pharmaceutical preparations is well known to all readers of the Pharmacopœia, and the processes therein described require no comment, but there is one method which deserves attention from its increasing application, and for having proved the solution of a very troublesome problem in organic analysis. I refer to the indicator known as phenolphthalein, and its application for the determination of free fatty acids. As is well known, litmus is scarcely affected by many of the weaker acids, but phenolphthalein indicates their existence with facility. Thus, if it be desired to ascertain the proportion of free fatty acid in, say, olive oil, it is only necessary to take a definite quantity of the sample, say 50 grams, and treat it with 3 or 4 ounces of methylated spirit, which is itself free from any trace of free acid. On then adding a few drops of a solution of phenolphthalein and running in a standard solution of caustic soda from a burette, agitating thoroughly after each addition, no change will be perceived as long as any free fatty acid remains unneutralized, but on the addition of the least excess of soda a permanent pink coloration will be produced. The reaction is definite, and the determination as distinctly marked as in the case of a mineral acid, but care is required owing to the high combining weight of oleic acid. The value of such a method is exemplified by the varying proportions of free acid present in various commercial samples of olive oil. Of course, those used for cooking and preparing salad are generally fairly pure; but the inferior specimens employed for lubricating often contain a very large proportion of free oleic acid, the amount in some cases reaching 25 per cent. The same process, employing a small quantity of the sample, can be used for examining oleic acid itself, which often is far from pure. It not unfrequently contains 10 per cent. or more of neutral fixed oil which has escaped saponification, and many samples also contain a notable proportion of hydrocarbons and other unsaponifiable matters. These facts seem hitherto to have escaped the attention of pharmacists.

One of the most valuable means of effecting the approximate analysis of organic substances is the employment of immiscible solvents, though in mineral analysis the method finds few applications. The process consists in the agitation of a substance in one solvent with another solvent insoluble, or only slightly soluble, in the former liquid. Under these circumstances the dissolved body is divided between the two solvents in proportions which are probably dependent on the relative solubility of the substance in the two media, and the relative quantities of the two media employed. Thus it may be supposed that if a substance be ninety-nine times more soluble in chloroform than in water, and its aqueous solution be shaken with an equal measure of chloroform, 99 per cent. of the whole substance will pass into the chloroform. On separating this layer and again agitating the residual aqueous liquid with an equal quantity of chloroform 99 per cent. of the remaining substance will be dissolved, thus making the exhaustion practically complete. Something also depends on the quantity of solvent employed, and the temperature at which the operation is conducted. Various immiscible solvents are used; ether, chloroform, amylic alcohol, benzene and petroleum ether being those most commonly employed. Each of these has its special applications, but where the substance to be dissolved is soluble in that menstruum I give the preference to ether above all others. Thus, when chloroform, benzene or petroleum ether is used, and the aqueous liquid is alkaline, a troublesome emulsion is apt to be produced, but this difficulty occurs far less frequently when ether is employed. The following table shows the behaviour of a variety of organic substances on treatment with acidulated and alkalized water and solvents immiscible therewith. It must not be supposed, however, that the immiscible solvents can be employed indifferently, as some of the bodies are removed from their aqueous solutions by one solvent, but are unaffected by others, owing to their limited solubility therein. This is especially the case with alkaloids and glucosides, and hence the table must simply be regarded as showing their general tendency. Details of their behaviour under such conditions are to be found in Dragendorff's well-known scheme for the separation of alkaloids, etc.

One of the best examples of the employment of a miscible solvent for the rapid assay of a pharmaceutical preparation is furnished by the Pharmacopœia process for examining the citrate of iron and quinine. This method, which was first suggested by myself, gives with reasonable care exceedingly accurate results. It consists simply in dissolving 50 grains of the scales in an ounce of water, adding excess of ammonia, and then agitating the liquid repeatedly with ether or chloroform until exhaustion is complete. The ether or chloroform in solution is then evaporated with the residual alkaloid, and should weigh at least $7\frac{1}{2}$ grains, equal to 15 per cent. in the preparation. By an extraordinary mistake, the Pharmacopœia, as originally printed, describes 16 per cent. as the amount to be found, although the method of preparing the scales rendered this percentage impossible to attain. So far as accuracy is concerned, I find it a matter of indifference whether ether or chloroform be used, but for convenience of manipulation give a decided preference to ether, as it separates very promptly from the aqueous liquid instead of forming the troublesome emulsion so often obtained when chloroform is employed. The first treatment with ether removes some $14\frac{1}{2}$ per cent. of alkaloid from Howard's citrate of iron and quinine, and a second treatment renders the extraction nearly complete, but the perfection of the treatment must not be taken for granted. I have fully established the accuracy of the process on specimens of known composition, into which definite amounts of alkaloid were intro-

duced, and have had no difficulty in recovering the quinine completely. A similar process is now prescribed by the Pharmacopœia for the assay of extract of nux vomica.

On agitating the substance with water acidulated with sulphuric acid, and a suitable solvent immiscible therewith (such as ether, chloroform, amylic alcohol, benzene, or petroleum ether), the following distribution will occur:—

Table showing the Behaviour of Organic Substances with Immiscible Solvents.

The acidulated aqueous liquid will contain carbohydrates, soluble alkaloids and acids, organic bases, proteids, etc., which may be further separated by adding a moderate excess of soda, and again shaking with a suitable immiscible solvent, when there will be obtained:—		The immiscible layer will contain hydrocarbons, oils, various acids, resins, colouring matters, phenols, glucosides, etc., which may be further separated by agitating the liquid with water containing caustic soda, when there wi be obtained:—	
In the alkaline aqueous liquid.—	In the immiscible layer.—	In the alkaline aqueous liquid.—	In the immiscible layer.—
Carbohydrates: as sugars, gums, dextrin.	Most vegetable alkaloids: as quinine, strychnine, aconitine, atropine, nicotine (cinchonine, morphine; the last two with difficulty).	Fatty acids: as stearic, oleic, valeric.	Solid hydrocarbons: as paraffin, naphthalene, anthracene.
Soluble alcohols: as methyl alcohol, ethyl alcohol, glycerin.	Coal tar bases: as aniline and its homologues (rosaniline), chrysotoluidine (pyridine), homologues of pyridine.	Various other acids: as benzoic, salicylic, phthalic, meconic.	Liquid hydrocarbons: as petroleum products: rosin oil, benzene.
Soluble acids: as acetic, oxalic, lactic, malic, tartaric, sulphophenic.		Acid dyes and colouring matters: as picric and chrysophanic acids, alizarin, aurin, bilirubin.	Essential oils: as turpentine oil.
Certain alkaloids or organic bases: as curarine, urea, glycocine, solanine, and possibly cinchonine, morphine and pyridine.		Acid resins: as colophony.	Nitro-compounds: as nitrobenzene.
Certain colouring matters: as indigo products.		Phenols and their allies: as carbolic and cresylic acids, thymol, creasote.	Ethers and their allies: as ether, chloroform compound ethers, nitroglycerine.
Proteids and their allies: as albumen, casein, gelatin.		Certain glucosides, etc.: as santonin, cantharidin, picrotoxin.	Fixed oils, fats and waxes.
			Neutral resins and colouring matters.
			Camphors: as laurel camphor, borneol, menthol.
			Alcohols insoluble or nearly insoluble in water: as amylic and cetyl alcohols, cholesterin.
			Certain glucosides, etc.: as saponin, digitalin, santonin.
			Certain weak alkaloids: as caffeine, colchicine, narcotine, piperine, theobromine.

The lecture, which was profusely illustrated with the most approved and modern apparatus, was listened to throughout with great interest.

Mr. Ward proposed that the best thanks of the meeting be passed to Mr. Allen, for delivering to the Society at so late an hour, and at personal inconvenience, the lecture they had listened to, and which the lecturer had preeminently adapted to the requirements of their calling.

Mr. Furness seconded the resolution, which was supported by Mr. Bradwall and carried unanimously.

Mr. Allen briefly responded, remarking that in his vocation as Borough Analyst it had always been, and would continue to be, simply his desire to do his duty. That an occasion like the present afforded an opportunity of mutual intercourse, and expressed the pleasure he had to thus meet the pharmacists of the town and neighbourhood.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The sixth meeting of the session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on the evening of Wednesday, January 12, at 9.15. Mr. William Duncan, President, in the chair.

The minutes of last meeting having been read and approved, the evening was devoted to the reading and discussion of a number of "Notes and Queries." The arrangements being under the charge of Mr. A. M. Macdonald, who opened the proceedings by reading a note on—

A Deposit in a Mixture: What is it?

The short note which I have to bring before you at this time refers to the following mixture:—

℞ Tinct. digitalis	. . . . .	℥j
Ferri et quiniæ cit.	. . . . .	℈ij
Acid. phosph. dil.	. . . . .	♎j
Infus. quassiæ	. . . . . ad	℥vj

On mixing the above ingredients a copious precipitate is produced, and after a rather incomplete examination of the matter, the opinion arrived at is that the precipitate is phosphate of iron or ferric phosphate, with a slight admixture of tannate of quinine obtained by the presence of the tincture of digitalis, and which does not redissolve in the phosphoric acid.

The mixture was made by me in the order of the ingredients in the recipe, so that the quinine was precipitated first; then on the addition of the phosphoric acid a copious precipitate was formed. No account was taken of the infusion of quassia. After removing the precipitate by filtration the filtrate will still be found to contain iron, which is due, no doubt, to the citric acid in the citrate of iron and quinine, which still holds some of the iron in combination.

After the precipitate has been well washed and dried, then redissolved in hydrochloric acid, decided evidence is obtained of the presence of iron, existing, I conclude, as a ferric phosphate, and on testing the precipitate a slight bitterness is felt, showing, as I think, that tannate of quinine, redissolved by the phosphoric acid, is present also. The conclusion, therefore, is that the main bulk of the precipitate is ferric phosphate.

This is then a clear case of incompatibility.

The next question is as to whether it is an intentional case. Perchloride of mercury with iodide of potassium or salicylic acid and bicarbonate of potassium; both of these are incompatible, but intentionally so. The case we are considering shows, on the part of the prescriber, a lack of acquaintance with chemical reactions. His object, no doubt, was to administer iron and quinine as a general tonic, whilst the phosphoric acid was to act as a brain tonic. It is probable he did not foresee the decomposition which takes place, producing an unsightly mixture. One is inclined to ask, "Could he not have found a better method?"

The discussion on this note was taken part in by Messrs. Lunan, Taylor, Stephenson and Robbie.

The following query was then submitted to the meeting:—"What should be dispensed when 'liquor taraxaci' is ordered." It was found that one half were in favour of the official succus and the other half in favour of the official extractum liquidum. It was felt that uniformity of practice would be a great advantage, and would prevent awkward occurrences, such as occasionally happen at the present time.

Mr. A. W. King then read the following:—

NOTE ON A SAMPLE OF DISTILLED WATER.

Some time ago in the course of business I had occasion to prepare some proof spirit. When I mixed the rectified spirit and distilled water I got a result which I certainly had not anticipated. Instead of the clear transparent liquid with which we are familiar I got a white opaque fluid which looked as if it had been mixed in a dairyman's milk-can. At first I thought the rectified spirit must be at fault, but an experiment or two showed that the blame lay with the distilled water.

Although this is the only time that I have seen this occur, yet it is not an isolated case, as a fellow-student informed me that about the same time he had had a similar experience. It is quite possible, however, that the water may have been obtained from the same source. The nature of the precipitate with the spirit pointed to the impurity being a salt of some kind, and on testing a little of the water it proved to contain calcium.

Going a step further the calcium was found to be in combination with sulphuric acid.

In short, the so-called distilled water was neither more nor less than a saturated solution of calcium sulphate. This impurity in the water is of such a nature that it runs a good chance of escaping detection, and as in this case the impurity was brought to light in the preparation of proof spirit, those pharmacists—and they are still a numerous body—who prepare their spirit with common water run a greater chance of failing to detect it.

Of course, in making solutions of lead, the impurity would be at once noticeable, though it is possible that the blame might be laid on the water containing CO_3. The amount of the salt in solution would lead one to suppose that the water had never been distilled, but the absence of chlorides shows that it is really a distilled water the method of collection in all probability being responsible for the impurity.

This freedom from chlorides would also allow the water to be used for nitrate of silver lotions without anything wrong being suspected. As this distilled water was obtained from a wholesale house of the highest repute in the trade, and as it certainly does not answer the tests of the British Pharmacopœia, the accidental discovery of this impurity confirms the declaration of our President in his opening address as to the necessity of a careful testing of drugs, etc., by the retail pharmacist.

Mr. Mackenzie stated that he had recently seen a similar sample which had been used for making a solution of potassium bicarbonate, and the resulting precipitate of $CaCO_3$ led to the discovery of the impurity.

Mr. Hill mentioned that he had recently received a precipitate from half a gallon of a solution of $KHCO_3$ made with distilled water. He had not yet examined the precipitate, but from its appearance he expected to find it to be $CaCO_3$, and probably the explanation was supplied by Mr. King's interesting paper.

Mr. W. Charles Baker then read a note on—

LINIMENTUM TEREBINTHINÆ.

In a review of the year 1886, the *Pharmaceutica Journal*, referring to this preparation, says it has been "as provocative of conflicting opinions as it appears to be prolific in diversity of products, which have been reported as ranging from thin, more or less permanent emulsions, to solid jellies. This variety in results has been referred with equal confidence to peculiarity in the turpentine used, the quality of the soft soap, the quantity of water, and the method of manipulation." The Journal points out that the discussion has shown that the last, namely, the method of manipulation, has an important influence on the final product.

Some of the correspondents of the pharmaceutical periodicals think that the quantity of water ordered in the B.P. is a mistake, and one, Mr. Baxter, suggests that the quantity should be doubled.

Mr. Michael Conroy, in a paper read before the Liverpool Chemists' Association, goes further than this, and says that if a liquid preparation be required, the quantity of water must be doubled. In his opinion the quality of the soap and of the oil of turpentine does not affect the result, and the mode of manipulation is the main factor in the case.

The first time I made this liniment (using sapo mollis, B.P., and commercial oil of turpentine) I got a beautiful, liquid, milk-like emulsion, which kept for some months and showed no tendency to separate. Making it again shortly afterwards, and using the same materials and B.P. quantities, I got a stiff jelly in which the pestle of the mortar would stand upright.

Seeing I had obtained such different results, although using the same materials, I naturally thought the cause must be the method of manipulation, and I then made a few experiments which confirmed me in the opinion—which Mr. Conroy has since shown to be his—that the quality of the turpentine has little to do with the final product.

While admitting the increase in the quantity of water to be a great improvement, I do not agree with Mr. Conroy that this is necessary in order to get a liquid preparation, and the sample which is shown (made with the B.P. quantity of water) will prove this.

After mixing the soap and the water together thoroughly, the turpentine solution of camphor should be added, very gradually at first, until an emulsion is formed; it should then be added in quantities at a time, and the whole stirred with the pestle until thoroughly mixed. If it be added too gradually after the emulsion is formed, a stiff jelly will be the result.

Mr. Leman stated that his experience was somewhat similar to that of Mr. Baxter, who found that pure materials gave the best results; but he found on making a second trial that even the finest turpentine and soap would give an unsatisfactory result if differently manipulated. He agreed with others who took part in the debate in attributing the various results to difference in the method of working.

Mr. J. Mackenzie then read a note on—

TINCTURA FERRI ACETATIS.

Lately this Association was treated by one of its members to an original note giving the results of some experiments made with reference to tinct. ferri acet., B.P

1885 (see before, p. 495). The author of that note complained of the want of stability of the preparation, and gave it as his idea that the decomposition was brought about by the presence of ammonia, from which it was a matter of great difficulty to entirely free the precipitated ferric hydrate.

The object of the note I am about to give is not intended in any way to upset the findings or ideas stated, but merely to lay before you a few facts regarding tinct. ferri acet. as I have found it.

At the outset, however, I must let you know that this tincture was not prepared by me, but at the same time I can give an unqualified assurance that it was prepared strictly in conformity with the directions given in the B.P., although apparently from the results I have obtained we must infer that there has been some condition either skilfully observed or accidentally present in the manipulation.

This tincture was prepared the day after the issue of the new Pharmacopœia. It has been kept in a clear glass stoppered bottle, and, although from its position, being at the back of other bottles, it has not been exposed to a strong light, still there has been no attempt to conceal it from the influence of that factor. For the last eight or ten months the bottle has been less than half full, and, lately, the stopper has been frequently taken out, and up to the present time there is not the slightest indication of precipitation.

On proceeding to examine this tincture I found the presence of acetic ether very evident, and, as I wished to take as little as possible for granted, I ascertained the presence of acetate of iron.

I filled a 1-ounce bottle with tincture, and have exposed it for six days to as strong a light as it is possible for us to get at this time of the year, at the same time keeping it in a warm place. I then put a quantity of it into a test tube and brought it to the boil, and both of these samples are still bright and clear, without the slightest indication of a precipitate.

I may mention, however, that upon boiling, or even heating, it assumes a dark port wine colour, which is not permanently deep, but whether it will come back to its normal colour again or not I have not had sufficient time to prove.

As the results of these tests appeared to be negative I feared lest the tincture might be deficient in the amount of acetate of iron it ought to contain. To ascertain this I estimated it by the B.P. process given for the estimation of the strong liquor, using of course an equivalent to 1 drachm of the strong liquor. The result of this I considered to be very satisfactory, for, after washing and igniting, I found the residue to weigh 5½ grains, and this made me pretty sure that it was not owing to any poverty of the preparation in that respect that no decomposition had occurred.

Finally I tested it for the presence of ammonia, and this I found to be present, not in large quantity, but nevertheless sufficient to give an evident reaction both with hydrochloric acid and glacial acetic acid. I likewise got a faint coloration with moistened red litmus paper.

I have now laid before you the facts I have ascertained about this tincture, and as you have all had a considerable time to digest the subject since it was first introduced, I hope some enlightening discussion will follow. Chemistry is no fickle dame that will give different results, given the same conditions; and as there are evidently some conditions required in this preparation, the observance of which will give us an elegant and stable tincture, I hope we shall be fortunate enough to discover them.

Although the results I have obtained are somewhat opposed to those given lately, still I fear no criticism or discussion. In going about these investigations I would have been equally as happy to get a precipitate as not. What I would like to see is the elucidation of the correct method for making this preparation. I regret very much that owing to want of time I was unable to prepare a tincture from the very foundation. Owing to the conflicting evidence in regard to the keeping properties of this tincture, however, I consider it very probable that the key to the whole affair lies in the method of manipulation, which I am quite willing in the meantime to hold as being accidentally observed, for I am led to understand others have prepared a tincture of equally stable appearance to that I have just dealt with without observing any special precautions; and as a sort of pillar for this argument, and as a beautiful illustration of the importance there may be attached to small things and the influence of the method of manipulation, I refer you to Mr. Baker's simple solution of the correct method to prepare lin. terebinthinæ.

Mr. W. C. Baker then made a communication on—

A Fungoid Growth in Liquor Strychninæ.

It was found that a sample of the liquor quickly developed a fungoid growth. The filtered liquor was stable. This, he thought, might be due to the cause indicated by Brunnengraber, who found that fungi grew in salts of alkaloids when they were spread out to dry. He found, however, that after filtering the distilled water through animal charcoal, a liquor made with it did not decompose.

In the discussion which followed it was stated, that probably living germs present in the water or organic substances favourable to the growth of fungi spores in the strychnia would be removed or destroyed by the charcoal.

The following notes were then read by Mr. J. Rutherford Hill :—

Abnormal Development in an Orange.

At a festive season, such as we have recently passed through, the faculty of scientific observation is probably, as a rule, allowed to remain in abeyance. Even at such a time, however, the habitual and thoughtful observer may come across phenomena of scientific interest which are worthy of a little consideration, as is indicated by the subject of this note.

A few weeks ago a member of the Association brought under my notice an instance of abnormal development in the common sweet orange, which, so far as I know, seems to be rather unusual. It not uncommonly happens that the carpels of an orange are more or less separated from one another, giving rise to what are called "horned" or "fingered" oranges, but the following departure from the ordinary structure is unusual. Externally, as you see, the orange is about the average size and shows no peculiarity of structure. The rind is unusually thin. On dividing it in two halves by tearing the carpels asunder, we discover the peculiar structure to which I would direct your attention. Unfortunately the specimen is not in good condition. It was laid aside for a day or two, and on again looking at it I found that a plentiful crop of the ubiquitous *Penicillium glaucum* had grown on the exposed surfaces, and to some extent obscured the abnormal structure. You will still, however, be able to make out its main features. It was found that these carpels were imbedded right in the centre of the other carpels, presenting the appearance of an orange inside an orange.

I had an opportunity of showing the specimen to Mr. Patrick Geddes, who thought that possibly the peculiarity might be due to starvation or deficient nutrition of some of the carpels. Another explanation might be that two sets of carpels, or a double ovary, were produced, and if so the cause would be precisely opposite, namely overfeeding, or excessive nutrition.

On examining the inner carpels they were found to contain seeds quite complete, though a little smaller than those in the outer carpels. The smallness might have been due to the pressure of the outer carpels. It was also observed that a distinct axis or peduncle passed up

through the outer carpels to the base of the three inner carpels. These circumstances seem to favour the view that there were at least two ovaries, and possibly two complete flowers, and that the phenomenon was really an orange within an orange.

Note on B.P. Infusions.

The following note is a reply to the query, "Should the B.P. infusions be made up to the measure of the quantity of menstruum ordered?"

I believe it is a very common thing in practice to answer this query in the affirmative. The Pharmacopœia, however, does not direct that such should be done, and it is an error to do so.

Take, for instance, infusion of senna. A considerable quantity of the menstruum is retained by the drug, and if the infusion be made up to 10 fluid ounces it will not correspond to the official strength of 2 ounces to 1 pint stated under senna. If, however, the official directions are closely followed the product, though measuring considerably less than 10 ounces, will correspond to the official strength. The making of infusions is therefore a wonderful operation, unless some means be taken to secure the active ingredients still left in the drug.

It is a common practice in pharmacies, when a prescription for, say, 10 ounces of any infusion is received, to put the quantities for 10 ounces in the infusion pot, infuse, strain, and make up to 10 ounces with water. The proper method would be to set on quantities for a little over 10 ounces, infuse, and strain off 10 ounces. By this means time is saved and efficiency secured.

Note on the Official Formulæ for Liq. Atropinæ Sulph. and Liq. Sodii Arseniatis.

Recently the following query was handed to me. How can the statement, "16½ fluid drachms or 99 fluid parts" in the official formula for liq. atropinæ sulph. be reconciled with the statement "2 fluid ounces (that is, 16 fluid drachms) or 99 fluid parts" in the official formula for "liq. sodii arseniatis?"

The explanation of the apparent discrepancy is found by referring to the preface to the 1885 Pharmacopœia, p. 8, where the following paragraph occurs :—

"An attempt has been made to introduce a method of setting out the relative quantities of ingredients used in some of the processes by supplementing the respective weights and measures by proportional parts. It was at first proposed that the use of parts should altogether supersede that of specified weights and measures, but it was thought better, at least for the present, merely to supplement weights and measures by parts where the context permits, and where this can be made more clearly to show the proportion which the several parts bear to each other. Wherever this method is employed, the term "parts" signifies parts by weight, and the term "fluid parts" signifies the volume of an equal number of parts (by weight understood) of water."

The use of the term "fluid parts" is unfortunate, and also misleading, and it would probably have been better to have said "parts" in all cases, letting it be understood that in every case "parts by weight" was intended. The use of the qualifying word "fluid" is, so far as I can see, quite unnecessary. The idea of grain measures seems to have been running in the minds of the editors, and I find that not a few are under the impression that "99 fluid parts" means 99 grain measures, and that a pipette or burette may be used to regulate the quantity. This, of course, is only correct for distilled water or liquids of exactly similar density. The specific gravity of camphor water in liq. atropinæ sulph. appears to be taken as between ·969 and ·970. That is to say, a flask that would hold 1000 grains of distilled water would only hold 969 or 970 grains of camphor water. Therefore, the 16½ fluid drachms of camphor water weigh practically the same as the two ounces (or 16 fluid drachms) of distilled water in the liq. sodii arseniatis, and thus, in both cases, the strength of the liquor is 1 per cent. by weight, not, as some seem to suppose, by measure.

As a matter of fact, however, I have never found any appreciable difference between the specific gravity of distilled water and camphor water made according to the official formula. When we recollect that the density of camphor is near ·992, and that it is only soluble in water to the extent of 1 in 1300 it is not easy to see how the density of camphor water can differ, to any appreciable extent, from that of distilled water. While the reason given for the discrepancy appears to be the real one, the fact remains, nevertheless, that some one has blundered. I think the editors have done so, but as this note has been hurriedly written, I should not be surprised if the author has miscalculated.

Note on Spurious Cubebs.

By the kindness of one of our honorary members, Mr. MacEwan, I am able to show you a sample of spurious cubebs, which is described in the *Chemist and Druggist* for November 6, 1886 (p. 620). "Among the lots catalogued for the last public sales of drugs was a parcel of five cases (each about 160 lbs.), berries imported from Bombay. The name under which the lot was catalogued was 'Cubebs,' but the parcel was not actually offered for sale, it being withdrawn by the auctioneers. These so-called cubebs consisted of a mixture of the berries of a species of *Rhamnus*, the immature fruits of common black pepper, a few pepper stalks, and flowers of *Alpinia*, together with some true cubebs."

The fraud is easily detected in the whole drug, but if ground it would probably be less easily recognized and possibly, not to say probably, it may find its way into commerce in the latter condition. I have recently come across evidence that seems to indicate that adulterated cubebs may be met with in commerce at the present time. Mr. MacEwan writes to me: "At present there is a parcel of pulv. cubebæ in Mincing Lane which has failed to find a purchaser. It seems to be siftings ground up, and could be bought for about £5 a cwt. True cubebs are worth £20 a cwt. in first hands at present."

I have also reason to doubt whether the published tests for genuine cubebs are sufficient to detect sophistication.

Specimen of a Drug offered as Senega.

I am also indebted to Mr. MacEwan for the sample of this substance, which I now show you. It is the root of *Chlorocodon Whitei*, a plant belonging to the Natural Order Asclepiadaceæ. Mr. MacEwan says—"It is known to the natives of Natal as 'Mundi,' and used by them as a tonic. It resembles Indian Sarsae in appearance. The root was not named in the drug catalogue, but brokers going round took it for senega, and would have bought it as such, had it not come from South Africa. They knew as much as to know that no senega comes from that quarter. If I said previously that the root was offered as senega, I withdraw the statement."

It can be very readily distinguished from senega. The variety of senega which it most resembles is that known as "Northern Senega," the root of *Polygala Senega* var. *latifolia*. I show a specimen of the latter for comparison.

On the motion of the Chairman, a cordial vote of thanks was awarded to Mr. MacDonald for the arrangement of the meeting, and to the members who had contributed notes.

Some queries were held over to a future occasion, and at the close of the meeting some new remedies were shown.

Proceedings of Societies in London.

ROYAL INSTITUTION.

The Sun's Heat.

"The probable origin, the total amount and the possible duration of the sun's heat," formed the subject of an interesting lecture by Sir William Thomson, on the 21st inst., at the first Friday evening meeting of the Royal Institution for the session. In considering the question of the quantity of heat that has been, and still continues to be, radiated from the sun, the lecturer reminded his audience that as information concerning the habits of animal and vegetable life does not extend much further back than three thousand years, historical data do not furnish sufficient evidence to show any appreciable alteration in the quantity of heat radiated. Since the earth, owing to its greater proximity, receives about 6½ per cent. more heat from the sun in January than in July without a very noticeable alteration in the temperature of the globe, it follows that a diminution of from 5 to 10 per cent. in the amount of the sun's heat in three thousand years would be barely perceptible. But although history fails in this respect, geology carries us back for some millions of years, and several indications point to the existence of the sun for a period of at least twenty million years. Mentioning the apparently almost unaccountable manner in which the sun continued to radiate heat, Sir William Thomson humorously remarked that as we travel round the sun once a year, it was evident it could not receive supplies by any underground railway or similar unobserved manner. Certainly a theory had recently been put forward that the heat is maintained by the impinging of innumerable small particles of matter upon the sun's surface with such force as to effect their combustion; but this, he said, has not been generally accepted. All present scientific knowledge, however, allows of the hypothesis that the sun is composed of red hot fluid matter, but whether in a liquid or gaseous state remains to be ascertained, since, as the gravity of the sun is twenty-seven and a half times that of the earth, under such increased pressure all the known conditions of dynamics would be altered. Some idea of the greater gravity of the sun, the lecturer remarked, can be gathered from the fact that although a mass of lead, falling 425 metres, on striking the earth's surface would generate sufficient heat to raise the temperature of an equal weight of water 1° C., yet with the sun's gravity a fall of 15 metres only would be required to obtain the same result. Sir William Thomson then described Helmholtz's theory as to the continual radiation of heat from the sun. The sun, he said, had gained its heat by coalesence, and although in giving out heat it cools and shrinks, yet the very decrease of the sun's bulk and consequent increase of its density causes further heat to be radiated. Although this might appear paradoxical at first, it must be remembered that the sun as a fluid continues to give out its heat by the continual contraction due to the action of its gravity. The lecturer proceeded to further explain the theory by resorting to figures, though in dealing with such a subject figures so stupendous are reached as almost to defy conception. He assumed as the nearest and most probable computation that the heat radiated by the sun, estimated as active energy, is equivalent to about four hundred and seventy-six thousand million million million horse-power; and as the extent of the sun's surface is calculated to be about six million million million square metres, this would give a radiation equivalent to seventy-eight thousand horse-power per metre of surface. Thus, then, the lecturer went so far as to say, if the active power of eight ironclads, each of ten thousand horse-power, could be concentrated as active power into one square metre of matter, it might be assumed that so much matter could be obtained in the same condition as it exists at the sun's surface at the present time. Further, the radius of the sun is calculated at six hundred and ninety-seven thousand kilometres, or about one two-hundred-and-fifteenth of the distance between the sun and the earth. Taking, then, the average density of the sun, as estimated, as about half the density of average rock, Sir W. Thomson said the weight of a section of the sun, one metre square at the surface, and gradually decreasing in proportion to the centre of the sun, would be about three hundred and twenty-six million tons. Supposing, then, this weight to be contracting with a spiral motion without friction, from the square metre surface to the centre of the sun, a contracting movement of only twenty-eight metres per year along the radius of the sun, if the gravity remained the same throughout, would generate sufficient heat by the compression of matter to preserve the radiation of the sun's heat at the estimate of seventy-eight thousand horse-power per metre. But since the gravity of the sun is greatest at the surface, and decreases in proportion until it is absolutely nothing at the centre of the sun, in order to maintain the radiation of the sun's heat at such a figure, an average contraction of the radius of thirty-five metres per year is required. This contraction would be equivalent to seventy metres every two years, or seventy kilometres every two thousand years. As a decrease of seventy kilometres in the sun's radius would be equivalent to a contraction equal to about one-hundredth per cent. of the sun's bulk, Sir W. Thomson mentioned that as a probability the sun will last at the present rate of radiation of heat at least about ten million years. Of course, the lecturer observed, in putting forward these figures he did not assert that any such movements of matter took place in the sun's body, but he only wished to explain that could such movements exist a body radiating the same amount of heat as the sun would be formed. As evidence of the probability of currents in the sun's body, he alluded to the sun's spots, which he considered to be caused by the flow of incandescent matter from the interior to the surface of the sun, whilst the surrounding parts consist of cooler matter. Sir W. Thomson mentioned that some theorists thought that the sun would last for a longer period than ten million years, but he considered that limit to be, if anything, an over-estimate of what might be expected of the sun in the future. Supposing the radiation of heat to have always remained constant, then, the lecturer stated, at a period of twenty million years back the sun would have been about four times its present size. He next proceeded to discuss various other theories proposed as to the total amount of the sun's heat, and alluded to one especially in which the determining influences were chemical combination, dissociation and reunion. As, however, one kilogramme of matter falling a distance of forty-five kilometres under the influence of the sun's gravity would attain a force more than equivalent to the heat generated by the same weight of any two bodies in chemical combination, an outside estimate of which would be three thousand thermal units, Sir W. Thomson thought that the power of chemical combination was trifling as compared with that of gravity. Still as conditions are considerably altered within the sun's sphere, more light will have to be thrown upon the kinetic theory of gases before a definite rejection of such an idea can be made. The lecturer then referred to the probable origin of the sun, and here again, without committing himself to a definite answer to the question, Sir W. Thomson contented himself with mentioning the conditions under which he considered it possible that the sun might have been formed. Two bodies, each equal to one half of the sun's mass and of the density of the earth, which is about four times the present density of the sun, might have met with great velocity; and if the distance by which they were originally separated were twice the distance of the earth from the sun, a transverse velocity of 1·4 would, on the collision, ensure the attachment of the two bodies by revolving one around the other, and, finally, by conglomeration. In this case, might not, the lecturer sug-

gested, the comets and other phenomena be but mere splashes from the meeting of two such bodies? Sir W. Thomson does not, however, confine himself to the assumption that there were only two bodies in collision, but as he himself put it, the lowest number is two, the highest, the number of atoms of which the sun's mass is composed. He then showed a few peculiar meteorites, which from their shape and composition supported this theory, showing, as they did, that they had evidently reached the earth in an oblique direction. The lecturer then created some amusement by remarking that he could not conclude with a good conscience without saying he did not know anything at all about the subject, and as a parting word he put forward the following speculation:—Although some of the sun's heat has reached the earth or other bodies, has it all arrived at some goal, or are the heat waves which started away from the sun twenty million years ago still travelling through the luminiferous ether or not? If so, as it is computed that the heat waves travel 186,000 miles per second, how far would they have reached at the present time?

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

A Correction.

Sir,—Please give me the opportunity of stating that in the Sheffield citrate of iron and quinine case alluded to last week in the report of the Chemists' and Druggists' Trade Association, Mr. Allen was right and I wrong. I and two other analysts found, on the average, 15 per cent. of alkaloid in the scales with which the medicine was made. We have since worked with fresh solvent, chloroform, and now only get 11½ per cent.; thus confirming Mr. Allen's result. The chloroform first employed obviously must have contained fixed matter. How it became impure we can never know, for the bottleful was all used before my suspicions were aroused. The mode of manufacture and storage of chloroform would indicate that the entrance of impurity, wherever it occurred, was quite accidental.

John Attfield.

The Proceedings under the Sale of Food and Drugs Act at Sheffield.

Sir,—In the report of the Law and Parliamentary Sub-Committee of the Chemists and Druggists' Trade Association, published on p. 597 of the *Pharmaceutical Journal*, reference is made to proceedings recently commenced in Sheffield against certain pharmacists for infringement of the Sale of Food and Drugs Act.

I may leave Professor Attfield to correct the erroneous impression produced by the reference to the case of improperly dispensing a prescription containing citrate of iron and quinine, but I must beg leave personally to contradict the statement that a summons was issued against a vendor of "·850 spirit of nitre." I send you a copy of my quarterly report as Analyst for the Borough of Sheffield, from which you will see that "out of six samples purchased as 'sweet spirit of nitre,' four were of fair quality, and one of decidedly inferior quality, but not sufficiently bad to justify its positive condemnation. The remaining sample was very deficient in the real nitrous ether, which is the most characteristic constituent of sweet spirit of nitre, containing only one-twenty-fifth of the minimum amount described by the British Pharmacopœia as present in the official 'spirit of nitrous ether.' The sample was in addition very deficient in alcohol, having a specific gravity of ·878, and containing only 67·5 per cent. of real alcohol."

This was the only sample of "sweet spirit of nitre" against the vendor of which a summons was issued. There were, however, two summonses issued against the vendors of samples purchased under the name of "spirit of nitrous ether," which samples had specific gravities of ·851 and ·857 respectively, and evolved in the nitrometer ten and nine measures of nitric oxide gas, instead of the "not much less than twenty-five measures" of the B.P. preparation. Clearly, however, neither of these samples can be that referred to in the report under the description of "·850 spirit of nitre." The report does not distinctly state, but certainly leaves it to be inferred, that the Association was prepared to dispute the propriety of my condemnation of the said sample and defend the vendor. If the Trade Association is to justify the appeal now being made on its behalf to the chemists of Great Britain, it should take care not to promulgate statements so ambiguous as to amount to injurious allegations against those whose duties sometimes bring them reluctantly in conflict with individual members of the trade while continuing to entertain a high respect for the great majority.

Sheffield. Alfred H. Allen.

North of England Pharmaceutical Association Meeting.

Sir,—I should willingly have let my ideas on the question of pharmaceutical education remain quiescent, had it not been that your report of the recent meeting of the North of England Pharmaceutical Association puts my name in print in connection with the subject.

I went to the meeting, hoping to hear a general expression from my fellow tradesmen of their views on the curriculum and Pharmacy Act question, and anticipating that there might be various shades of opinion, as appeared probable from the discussion which took place some time before in the Council of the Association. I had drafted two amendments, with the view of submitting one or other should the tone of the discussion render it desirable. But though the Secretary had told me he had sent out eighty circulars calling the meeting, there were only four establishments represented there. That is, the President and three of his staff, myself and partner, the Secretary and one other member of the trade.

It certainly is very hard upon the President, after providing all the enthusiasm to be found in the Association, and two-thirds of the work from his own place of business, that he should have to provide half the meeting also.

The President was of course bound to submit the resolution of which he had given notice; but as I had not told anyone of my intention, I was not so bound, and thought a motion, if carried by so insignificant a meeting, was scarcely better than lost, so I concluded to refrain.

When appealed to by the Chairman for my views, I said I could support his resolution down to the word "satisfactory,"—"That no scheme for remedying the defects in the present system of examination in pharmacy can be satisfactory."

This was cordially laughed at, but I declined the President's kind offer to have it put to the meeting as an amendment. The original resolution perhaps implies that the course proposed (the curriculum, etc.) would be satisfactory. Inasmuch as there is this implied meaning, I could not support it. Inasmuch as this is not actually stated, I did not feel bound to oppose it. In its somewhat vague construction, I thought it mattered little whether it passed or not, and the bulk of the trade signified the same by their show of absence.

Eighty were called, eight-twelfths of a dozen came, and half gross absent (half gross negligence). Virtually my view had the support of the absent ones; they evidently thought it little matter whether the resolution passed or not. By the way, Mr. Editor, that is rather a happy thought. In future, when the moral support of the trade is required on any point, print the contrary on the circular calling the meeting, and assume that all the absent ones do not support the contrary.

But to return to business. It is very creditable to our Secretary that he can make so presentable a report of so small a meeting. In the absence of a shorthand writer we cannot expect any one's words to be exactly reproduced. He could not know that I had two amendments drafted when I did not tell him, and what he reports is nearly correct. There is just this little difference, that I had the following drafts ready, but did not care to submit them to the meeting where the President and his staff constituted half the company, myself and partner half the remainder, and—I do not mean it in any offensive way when I say that the two other voters were not large and influential bodies.

"1*st Draft.*—That no scheme of improved pharmaceutical education can be satisfactory which does not provide some improved prospect of the educated pharmacist being able to make a living by the practice of pharmacy."

This, I felt, had the same fault as the President's resolution; it is merely negative, so I wrote:—

"2*nd Draft.*—That any scheme of improved pharmaceutical education will be satisfactory which provides an improved prospect of the educated pharmacist being able to make a living by the practice of pharmacy."

I believe if a large body of voters had been present either of these would have been preferred to the original.

I think the only remark I did make worth reporting was that the best effect of the curriculum would be its keeping many men out of the pharmaceutical ranks, and that had it been in force when I was an apprentice I should probably have been excluded from the list of pharmaceutical chemists to this day.

11, *Grey Street, Newcastle.* BARNARD S. PROCTOR.

ARE TRADE STANDARDS FOR MEDICINAL PREPARATIONS DESIRABLE?

Sir,—It is with considerable feelings of regret that I have read the leading article in your issue of the 22nd inst. That the outcome of over eighteen years of pharmaceutical legislation should be "for pharmacists to find themselves forced into an apparent competition with other classes of traders, who supply articles nominally of the same kind as they do, and hold themselves out to the public as the purveyors of drugs and medical preparations," is indeed a let-down from the high pretensions for care of public safety which have hitherto been deemed the special object of the Pharmaceutical Society. I think, however, that in this matter you have based yonr argument on a wrong foundation. The case of the weak tincture of opium is not a case of outside competition. Of course, none but a chemist could legally supply any preparation of opium, and, therefore, the supposition of outside competition falls to the ground. Has not this fact been overlooked? That the control of the strength of the preparations sold by pharmacists and chemists is in the hands of the Society is clear, whether it is legally clear is another matter; but the 15th section of the Act seems to give the Society power to see that all preparations of the Pharmacopœia are of the proper strength. If tincture of opium is not a pharmacopœia preparation, then the sooner the better either the Pharmacy Act and the Sale of Food and Drugs Act are altered, or else the entire legislation as to pharmacy is rescinded.

You also state that "we do not believe a remedy is to be sought for this evil by legislation or by restrictive regulation of trade of any kind." If that is the case, why consult the public safety by having an Act of Parliament placing the sale of certain poisons in the hands of men who have entered a trade under restrictive regulations?

If restrictive legislation is to be deprecated, then the Pharmacy Act ought to be abolished. Your farther recommendation that pharmacists should conform to the guidance of the B.P., "not out of fear of the law, but from a professional regard," would then be applicable. As to the argument that the general public is the arbiter, and that public appreciation will be given to the advantages obtained from pharmaceutic skill, surely if the public appreciated diluted tinctures they will equally appreciate diluted skill.

Nor can I agree with you that it is not expedient to establish a compulsory standard for all persons.

This has been the intention of all recent regulations and Acts of Parliament, and if the safety of the public is to be consulted at all it should be by securing to it the uniformity of remedial agents.

The decision of the stipendiary is no doubt a great discouragement, but as a case has been cited for discussion in a higher court we hope that it may be reversed. Yet your article, I may venture to say, is a still greater disappointment, and one cannot but be pained to hear from our younger members the very natural exclamation, "Oh! what is the use of studying or passing an examination if this is to be the result!"

can only hope that if the appeal case results in the stipendiary's ruling being upheld that immediate action will be taken to make the B.P. the standard for all articles bearing the names of its preparations.

4, *High Street, Sheffield.* GEORGE A. CUBLEY.

Sir,—Some of the views contained in your leader of last week's Journal, on the resolutions passed at the recent meeting of the chemists of this town, will not, I venture to think, commend themselves to the sound judgment and approval of the majority of pharmacists—those who are bent upon maintaining the standard and purity of their preparations.

To hold, "It should not be a matter of any importance to them what the oilman, or the grocer, or the stores, might sell under the name of any medicinal preparations, but they should seek to establish such a repute with the public for the quality of their drugs and preparations, as to command custom by reason of the confidence felt that the articles purchased by them could be relied upon, because they were supplied by a pharmacist," is to my mind wholly wide of the mark, and with the former part of the quotation I entirely disagree. It seems to me to be a matter of very grave importance indeed, and one that demands our serious consideration as to whether the grocer or the stores shall be permitted to impose upon the public comparatively inert preparations, such as paregoric minus the opium. It is too serious a question to be allowed to lie dormant and without arousing public interest and public enlightenment. The Council of the local Association was, in my opinion, perfectly justified in calling together its members and passing the strongly worded resolutions they did. By this means the whole affair has been exposed, and the particulars put forcefully and intelligently before the mind of the public. I do not attach much importance to the ruling of the stipendiary, as to whether he was in the right or the wrong in his interpretation of the law—although I believe he was decidedly wrong according to the evidence adduced and the true facts of the cases—but I contend it does matter whether powerful and popular remedies—some even poisonous ones—shall be made up of inert substances in lieu of the more active, such preparations being well known by authentiated and recognized formulæ.

The poorer classes of our towns are not for the most part capable of ascertaining for themselves the uniformity and purity of the many medicinal remedies they require, and it is but an act of simple justice they should be supplied with the article demanded, and more particularly so when such article is acknowledged and known to be a Pharmacopœial preparation. May the day soon dawn when the British Pharmacopœia will contain its well-known synonyms.

Sheffield. WILLIAM WARD.

LIQUOR STRYCHNINÆ, B.P.

Sir,—I read with great interest Mr. E. H. Farr's note on Liq. Strychninæ, B.P., 1885. I made 4 ounces of it during last summer strictly according to the Pharmacopœia, but to my astonishment and alarm, when requiring a small quantity a fortnight since, for dispensing, I found a plentiful crop of crystals had settled to the bottom of the bottle. I could not understand it, as in the case of so powerful a preparation, I was particularly careful in strictly carrying out the B.P. directions.

Foulsham. H. G. MADDISON.

H. W. Green.—Custard Powder.—The following recipe is given by Cooley:—Sago meal, 2 lbs.; powdered turmeric, ½ oz.; bitter almond powder, cassia and mace, of each ½ dr. For preparation of butyric ether, see last week's Journal, p. 604.

A. F. Brookes.—Probably the sales to which you refer were of the nature of wholesale transactions. If not, information respecting the practice should be forwarded to the Registrar, 17, Bloomsbury Square.

H. B. G. Morris.—The report of the Committee on Education and Examination will be found in the Journal for April 15, 1882; the discussion and resolutions thereupon in the Journal for March 10, 1883. Mr. Barclay's paper was published in the Journal for November 27, 1886. Other papers, etc., will be found indexed under "Curriculum."

Pinus.—The oil in excess appears to liberate some of the liquid of the Lin. pot. iod. c. sapone.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Maddison, Eagle, Marshall, Vizer, Wokes, Jones, Farr, Armstrong, Newsholme, Phenol, Reformer, W. Baxter, Jun.

A Few Specialties and Novelties

INTRODUCED BY

BOURNE, JOHNSON & LATIMER.

	£	s.	d.
ABSORBENT COTTON WOOL—			
A cheap, clean, and ready mode of making all kinds of local applications, and a substitute for Sponge, 1/9 per lb.; also in boxes, per doz. 3/- and	0	6	0
ABSORBENT TISSUE—			
A layer of absorbent wool in absorbent gauze (Gamgee's Patent) ... ... per lb.	0	2	0
ABYSSINIAN SODA-WATER TAPS— The best Taps in use.			
Common quality ... ... per doz.	0	15	0
Nickel Plated ... ... „	0	18	0
ADHESIVE PLASTER— On flesh-colour fabric.			
Each in tin case. Sticks readily without being warmed. In counter cases of 1 doz. ...	0	3	6
BABY'S FRIEND—			
An ingenious contrivance for regulating the supply of food, thus preventing the over-feeding of infants ... ... per gross	0	9	0
BABY'S TOILET BOX—			
A handsome case containing comb, brush, violet powder, and nursery pins ... per doz.	0	16	0
CACHOU LOZENGES—			
Fragrant Bouquet, per lb. (in 2 lb. bottles) ...	0	1	9
Peppermints ... ... per lb.	0	1	6
Fragrant Bouquet, in boxes ... ... per doz.	0	4	0
Ditto, in boxes to sell at ... ... „	0	2	0
Ditto, ditto ... ... „	0	4	0
CAMEL HAIR PENCILS—			
1 gross assorted in a show case containing duck, goose, and extra goose ... per gross	0	4	6
Ditto, ditto, with swan pencils and sticks „	0	6	0
CEMENT— Chinese, transparent colourless liquid.			
12 sixpenny size, in glass-top box ... per doz.	0	4	0
6 one shilling size, ditto ... ... „	0	8	0
Holdfast, 12 threepenny size, on show card, per doz., 2/-; 12 sixpenny ditto per doz.	0	4	0
CORN PAINT BOTTLES—New pattern.			
Actinic green, with wood top and camel hair brush affixed, ¼ and ½ oz. ... per gross	0	18	0
Cases for ditto ... ... „	0	4	0
CORN RUBBERS—			
New "Cure for Corns," 6 on a card ... per doz.	0	2	9
Sixpenny size on bone handles, 6 or 12 on a card... ... ... per doz.	0	4	0
Shilling size (Alexander's), 6 on a card „	0	7	6
FLOATING LIGHTS (Tin)— With Reflecting Float.			
In boxes containing 60 lights... ... per doz.	0	4	0
Ditto ditto 120 ditto ... „	0	8	0
Only need an introduction to create a demand.			
INHALERS—			
The Universal Inhaler, same pattern as Dr. Taylor's (earthenware), to hold hot water, with burnt-in directions for use, with glass tubes ... ... per doz.	0	18	0
LINT—			
Hospital quality ... ... per lb.	0	1	9
Second quality, surgeon's ... ... „	0	2	0
Super surgeon's ... ... „	0	3	0
Flax ... ... „	0	3	6
In packets ... ... per gross, 7/- and	1	1	0
In boxes ... ... per doz., 3/6 and	0	7	0
Special quotations to buyers of 1 cwt.			
MEDICATED JAPANESE "CURL" PAPER—(As soft as silk.)			
500 sheets in a packet... ... ... per doz.	0	4	0
Stray Leaves from Japanese Papers, very saleable ... ... per doz.	0	8	
MEDICATED SANITARY PAPER—			
In Suspender case, for the toilet or nursery. Very saleable ... ... per doz.	0	8	0
Cases containing 50 packets	1	12	0
MEDICINE CASE—			
Graduated tumbler, in leather case ... per doz.	0	8	6
(The cheapest article in the trade.)			
Ditto, with minim measure ... per doz.	0	16	6
With nursery tumbler, in leather case „	0	8	0
Ditto, ditto, in boxwood ... ... „	0	9	0
MENTHOL—			
A remedy for neuralgic pains. Not liable for stamp duty, being a pure drug.			
In paper cases ... ... per doz.	0	4	0
In nickel plated jars ... ... „	0	8	0
One dozen in a counter box.			
MUSTARD LEAVES—			
Penny size ... ... per gross	0	9	0
Sixpenny size ... ... per doz.	0	4	0
1 dozen mounted on an attractive show card. (4 leaves in a packet.)			
NURSERY APRONS (Full size)—			
Black Alpaca ... ... per doz.	0	18	0
Check ... ... „	1	4	0
Super quality ... ... „	1	10	0
NURSERY LAMPS—			
The "A.B.C." The cheapest article ever introduced. Burns kerosene oil ... per doz.	1	2	0
Also the "Eclipse" Lamp for burning colza oil, with wicks and float complete, per doz.	1	4	0
SANITARY PADS OR TOWELS—			
For Ladies' Use. The cheapest and best article ever introduced for the comfort of ladies, especially while travelling. They are made of absorbent cotton wool ... per doz.	0	1	0
SEAT CUSHIONS (Waterproof)			
A *sine qua non* for travellers. Folds up in a small compass for the pocket, per doz. 13/-			
SOAP— and	1	1	0
Transparent, in ½-lb. and 1-lb. bars ... per cwt.	2	16	0
Ditto, in tablets, 2, 3, 4, 6 to the lb., „	2	18	0
Toilet, in ½-lb. and 1-lb. bars ... „	2	16	0
Ditto, in tablets, 2, 3, 4, 6 to the lb., „	2	18	
Oval Transparent tablet (wrapped) ...per gross	1	4	

BOURNE, JOHNSON & LATIMER,

Wholesale & Export Druggists' Sundriesmen, 34 & 35, Furnival Street, Holborn.

WALNUT POMADE

A Triumph as a Hair Darkener.
Easy to Apply.
Easy to Remove.
Once Commenced — always Used.

As a simple, effective, pleasant and nourishing preparation it can be conscientiously recommended to a customer whose hair is becoming grey, red or white.

Three Colours: Light Brown, Dark Brown and Black.

Pots—¾ oz. (1/6) 12/- per doz.; 1½ oz. (2/6) 20/- per doz.

Agents—Barclay & Sons, Edwards & Co., Maw, Son & Thompson, and Sanger & Sons.

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EUGENE MORPHY, 70, South Audley St., Mayfair, London.

WRIGHT WHOLESALE & EXPORT DRUGGISTS. IMPORTERS & DISTILLERS OF ESSENTIAL OILS.
PRICES CURRENT ON APPLICATION
LAYMAN MANUFACTURING CHEMISTS
TINCTURES. ETHER. & CHLOROFORM. IN BOND.
SOUTHWARK. LONDON.
& UMNEY.

Great Saving in the purchase of New Medical Dispensing Bottles and Phials at the Islington Glass Bottle Company (H. HARRIS & CO., Proprietors), 153, Upper Thames Street, City, London, E.C.

Before ordering the above see our newly Reduced Price List, which is forwarded free on application; also for Blue Poison Bottles, Round Shouldered Phials, Castor Oil Bottles, Flat Panelled Bottles, Direct Square Dispensing Bottles, Citrate of Magnesia, Essence Bottles, Pomade Bottles, and all other kinds.

ESTABLISHED UPWARDS OF FIFTY YEARS.

DINNEFORD'S
FLUID MAGNESIA.

Perfect in purity and uniform in strength.
The most efficacious antacid and mild aperient for delicate constitutions, ladies, children and infants.

Of all Wholesale Druggists.

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CHEMISTS TO THE LONDON HOMŒOPATHIC HOSPITAL,

Manufacturing Homœopathic Chemists

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Illustrated Prospectus and Trade Lists forwarded post free.

Agents' Show Cases from 50s. to £20.

59, MOORGATE STREET, E.C.

METHYLATED SPIRIT & FINISH

LICENSED MAKERS

A. & J. WARREN

Wholesale & Export Druggists, 23 & 24, Redcliff St., Bristol

Who offer the same in tins and casks, and can supply best Rectified Spirits of Wine in quantities of two galls. and upwards.

ALSO

STODDART'S SEA SALTS.

Established nearly 40 years. Advertised continually.

1½d. Packets (in dozen boxes), 12/- per gross.

2 lb. Boxes ..	4/- per dozen.	28 lb. Bags ..	36/- per dozen
7 lb. ,, ..	9/6 ,,	56 lb. ,, ..	72/- ,,
14 lb. ,, ..	18/- ,,	112 lb. ,, ..	144/- ,,

Right of manufacture, good will, &c., purchased March 15, 1886.

TERMS:—Monthly Account, less 10 per cent. A reduction on 5 cwt. and 10 cwt. lots.

Carriage paid on orders for the above article amounting to £2 and upwards. Handbills and Showcards furnished on application.

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FOR COUGHS.

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TRADE N & P MARK.

AËRATED WATERS, NEWPORT PAGNEL.

ESTABLISHED 1835.

SODA, POTASH, SELTZER, AËRATED (without Alkali), and LITHIA WATERS.
LEMONADE & GINGER ALE.

Each Bottle is protected by a Label bearing the Signature of the Firm.

Purity and Excellence of the Water certified by Analysis by Professor ATTFIELD, Ph.D., F.C.S.

"RAMORNIE." LIEBIG'S EXTRACT OF MEAT.

The only Brand supplied to the War Office.

7 lb. Tins	per lb. 5/11	each	41/5	4 oz. Jars	per lb. 6/7	per doz.	19/9
1 lb. Jars	„ 6/2	per doz.	74/0	2 oz. Jars	„ 7/0	„	10/6
½ lb. Jars	„ 6/4	„	38/0	1 oz Jars	„ 7/8	„	5/9

Write for Detailed Price List to the Australian Meat Co., 9 and 11, Fenchurch Avenue, E.C. 6 *lbs. Carriage Free.*

ROBINSON & CLEAVER'S

IRISH DAMASK TABLE LINEN

Fish Napkins, 2s. 6d. per dozen. Dinne Napkins, 4s. 6d. per dozen. Table Cloths, 2 yards square, 2s. 9d.; 2½ yards by 3 yards, 5s. 6d. each. Kitchen Table Cloths, 11½d. each. Strong Huckaback Towels, 4s. 4d. per doz. Monograms, Crests, Coats of Arms, Initials, &c., Woven and Embroidered. Samples and Illustrated price lists post free to any part of the World.

ROBINSON & CLEAVER, By Special Appointments to H. M. the Queen and H. I. & R. H. the Crown Princess of Germany, BELFAST. Telegraphic Address:—"LINEN," Belfast.

ROBARE'S AUREOLINE

OR GOLDEN HAIR WASH.

The attention of the Trade is respectfully called to the above Article, now having a large sale and giving an excellent profit to the retailer.

5/6 size ... ... 36/- per Dozen.
10/6 „ ... ... 72/- „

Sole Wholesale Agents, R. HOVENDEN & SONS, LONDON.

As used by Madame **MARIE ROZE.**

WOODS' ARECA NUT TOOTH PASTE

Sold in all parts of the world at 6d. and 1s. per Pot.

CAUTION.—See WOODS, Chemist, PLYMOUTH, on Pot.

SOLD BY ALL WHOLESALE HOUSES.

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(COX'S PATENT.)

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Chemists selling TASTELESS PILLS *have an advantage over others neglecting to do so.*

We strongly recommend our Aperient Pills at 6s., Compound Rhubarb at 6s., and Pil. Cochiæ at 5s. per pound, coated, as saleable Pills. These, or any Pills in our list, are sent out to every part of the United Kingdom in half-pound parcels, package, postage, and carriage free, on the same day as the order is received; and, to avoid booking and other expenses, 1d. in the Shilling will be allowed if Stamps or P.O.O. are remitted with order.

More than Thirty years' success, as proved by unsolicited Testimonials from Medical Men in almost every town and village in the kingdom, has produced imitations likely to bring a useful invention into disrepute, as a large percentage of the Varnished Pills made to imitate ours pass through the stomach unaltered.

The Registrar of Trade Marks (after giving the usual public notice prescribed by Parliament to allow of opposition) has granted us the above "Trade Mark," thus officially recognising us as the "ORIGINAL MAKERS OF TASTELESS PILLS," and no pills will be sent out without this mark on all bottles or packages.

Any Formulæ Dispensed, Covered, and Estimates given.

Samples, with a list of pills from upwards of 600 different forms which are kept in stock, will be forwarded free on application.

ARTHUR H. COX & CO. *Tasteless Pill Manufacturers,* **Brighton.**
TELEGRAPHIC ADDRESS, "COX, BRIGHTON."

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REGULAR importations of the finest Jamaica Bees-Wax. Can supply either large or small quantities, and at prices much below that charged by the usual trade. Send 2d. Stamps for Samples, Prices and Illustrated Trade Catalogue.

Address, S. J. BALDWIN, The Apiary, Bromley, Kent

THE PERFECT SURGICAL BANDAGE

Preferred to all Makes hitherto used.

In Cases of Twelve Six Yard Rolls, 2 inches wide, 3s. 9d.; 2½ inch, 4s. 6d.; 3 inch, 5s. 6d.; or, case containing twelve six yard rolls of each width, 13s.

Free by post, to any address in the United Kingdom, for prepaid orders only. Manufactured by

The BOLE HALL MILL CO., Tamworth, Staffordshire.

S. SAINSBURY'S

Prepared from the finest English Lavender without any foreign whatever. **Lavender**

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Prices from 1/ to 6/.

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HAS RECEIVED THE HIGHEST AWARDS AT ALL THE GREAT EXHIBITIONS.

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Acid Sulphurous.	Emp. Picis.
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Dec. Senegæ Co. Conc.	,, Rosæ Co.
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Kay's New Transparent Cement for Broken Articles.

KAY'S COMPOUND ESSENCE

Of LINSEED, ANISEED, SENEGA, SQUILL, TOLU, &c. (with Chlorodyne).

"The Stockport Remedy" for Coughs and Colds.

LINSEED LOZENGES (Solidified Linseed Tea).

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KAY'S THROAT LOZENGES, for Relaxed or Sore Throat,

KAY'S INSTANT CURE for Toothache.

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IMPROVED CUE TIP FIXER.

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KAY'S TUBES for Feeding Bottles, with patent glass valve. Fit all bottles, and prevent children sucking air.

KAY'S RESPIRATORS.—GOLD PLATED, 2/6 and 5/6.

SAPO-LINI, a Saponified Linseed Jelly; an excellent Toilet Soap.

All articles containing Scheduled Poisons are so labelled.

THE BEST ELASTIC STOCKINGS, LEGGINGS, SOCKS, KNEE CAPS, &c. } 25% discount to Chemists.

Prices, Show Cards, Circulars, Specimens, &c., on application.

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The Original Preparation of the Inventor,

Has been in use for over 60 years as an excellent remedy in cases of **Acidity, Indigestion, Heartburn, Gravel and Gout.**

Sold by all Chemists in Large-sized Bottles (the 1s. size containing just double the quantity usually sold at same price) at 1s., 2s. 6d. and 3s. 6d. each.

CAUTION.—Observe the signature of the Inventor on every label.

His **FLUID CAMPHOR** is a valuable remedy for **Sleeplessness** and **Weak Nerves.**

Bottles, 1s. and 2s. each.

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PURE SPIRITS OF WINE.

To Wholesale Druggists, Chemists, Perfumers, &c.

WE are now supplying *Sp. Vin. Rect.*, extra and first qualities, at a very low figure for cash; free from smell, and perfectly clean, also in bond, for exportation.

Methylated Spirit & Finish, 64 O.P.

We are selling the above at the lowest possible cash price of the day, in quantities of Five Gallons and upwards. Quotations upon application.

Naphtha at current market rate.

Catalonian Sherry, *7s. 6d.* per gallon, nett.

A good sound wine, combining body and strength, and specially adapted for medicated wines and other purposes.

Orange Wine, finest quality; guaranteed not to cause a deposit or become opaque by the addition of quinine. *5s. 9d.* per gallon, nett cash. Second quality, *4s. 9d.*, nett.

Our Celebrated Pure Spirit of Wine

Is used by all the principal Wholesale Druggists, Pharmaceutists and Perfumers in town and country (54° to 65°), and will bear testing with Ammonia. It is allowed to be the best article for making Tinctures, Essences, and the most delicate Perfumes, being perfectly free from smell and fusil oil.

Packages to be paid for and allowed upon return.

E. BOWERBANK & SONS,

BISHOPSGATE DISTILLERY,

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Also at DUNNING'S ALLEY and 1, LAMB ALLEY.

N.B.—No connection with the house styled Bishopsgate Distillery and Wine Company.

ESTABLISHED 1782.

Chemists' Tea Agency.

WALKER & DALRYMPLE'S
BROKEN-LEAF TEA, 1s. 8d. per lb.

A MONEY SAVING TEA. ABSOLUTELY PURE.
The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

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INTERMEDIATE TEA, 2s. per lb.

BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

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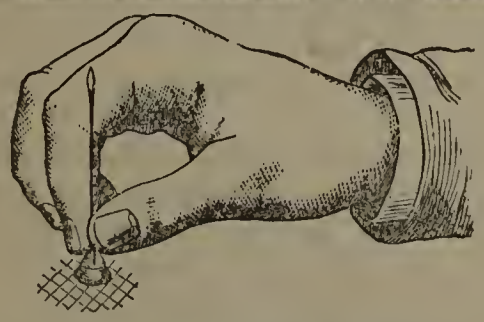
Prospectus and samples free on application.
Warehouses, 154, 155, 159 and 160, Whitechapel Road, and 2, 4, 6, 8, 10, 11 and 12, Brady Street, London.
P.O.O. payable at head office. Bankers, the National Provincial Bank of England.



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A GENUINE Business, returning from £500 to £800 per annum. Preference given to one with Dental connection attached, or an opening for same. Full particulars will oblige. A. R. B., 73, High St., Guildford.

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A GOOD class Retail and Dispensing Business, returning from £800 to £1000. Must bear every investigation. Principals only treated with. Full particulars to J. B. Purvis, 13, Ravensbourne Ter., South Shields.

PLATE-GLASS sponge case, fig. A 41, 65s.; ditto, ditto, as fig. A 43, 95s.; show steps, A 37, 50s., as fig. A 39, 15s.; desk and glass case, A 31, 60s.; a ditto, ditto, 50s.; a number of dispensing screens, from 5ft. to 8ft. long, glass case at each side, with silvered plate glass in centre and marble slab in front, tablets on top of cases, and shelves at back for dispensing bottles, very elaborate, from £6 10s.; a 3ft. ditto, as fig. 54, 45s.; 3ft. 6in. ditto, 55s.; 4ft. ditto, 60s.; 4ft. 10in. ditto, 70s.; 5ft., as fig. A 55, 95s.; 6ft., £5 10s.; 6ft. 6in., £6; 7ft. ditto, £6 10s.; and a quantity of other screens very cheap; several pairs specie jars equal to new, royal arms, &c., &c., on mahogany stands, from 24in. to 40in. high, price £4 to £6 10s. a pair; several pairs carboys, 10, 12, 14 and 16 gals., with mahogany stands, and a number of smaller sizes; dome-covered pink ointment jars, gold labelled, any names, 3s. 9d. each; a lot of second-hand green, blue, 3 and 4 lb. ditto; a ½ gal. displacement apparatus, fig. 53; black store bottles, 1 gal., with japanned caps, 1s. 3d. each.—E. Natali, 207, Old Street, London, E.C.

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A NUMBER of flat glass cases, various sizes, from 2ft. 6in. long to 6ft. long, as fig. 2, to open at back, also some to open at top, to be sold very cheap to make room; also a number as fig. 3, 2ft. long, 30s.; 2ft. 6in. long, 32s.; 2ft. 8in. long, 35s.; 3ft. long, 40s.; 3ft. 6in. long, 45s.; as fig. A 8, 5ft. long, 95s.; 6ft. long, £5 10s.; as fig. A 15, 9ft. long, £8; 5ft. 6in. long, £4 10s.; as fig. A 16, 3ft. long, 55s.; 3ft. 6in. long, 60s.; 3ft. 9in. long, 65s.; 4ft. long, 70s.; as fig. A 17, 4ft. long, 75s.; as fig. A 18, 5ft. long, £5; 6ft. long, £5 10s. A splendid plate-glass counter case, 7ft. 8in. long, 23in. wide, 12in. high, glass ends, silvered glass back, to open, £7 10s., a great bargain; tooth brush cases, as fig. A 9, 35s.; as fig. A 10, 50s.; 6ft. case, to open in front, plate-glass and mahogany stand, £8. A silvered plate glass in ebonized frame, 7ft. by 2ft. 9in., 75s.; a ditto, ditto, 7ft. by 2ft. 6in., £3 5s.; 7ft. mahogany dispensing counter and screen, fitted with sink and drawers, very elaborate, £12 10s.; several very massive wall cases, about 10ft. long, cheap. E. Natali, 207, Old Street, E.C.

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 867.] SATURDAY, FEBRUARY 5, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

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RICHARD BREMRIDGE, Secretary and Registrar.

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EVENING MEETING.

The first Evening Meeting for the session will be held in the Society's House, No. 36, York Place, Edinburgh, on February 16th, at 8.30 p.m. Mr. H. Bellyse Baildon in the chair.

After a short address by the Chairman, a paper on "The Evidence for the Existence of Acid Morphine Meconate" will be read by Mr. D. B. DOTT.

EVENING MEETING.

The next EVENING MEETING will be held on Wednesday, February 9th, at half-past Seven o'clock.

The chair will be taken at Eight *precisely*.

The following paper will be read :—

Laboratory Notes :—1. "The tests of Quinine Sulphate." 2. "Determination of Caffeine." 3. "Cocaine Hydrochlorate." By Dr. B. H. PAUL.

Some important donations recently presented to the Museum will be exhibited and described by the Curator.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

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The Board of Examiners for England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners for Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

IMPORTANT NOTICE TO ADVERTISERS.

SPECIAL ISSUE OF THE

Pharmaceutical Journal

ON FEBRUARY 26, 1887.

The Council of the Pharmaceutical Society has ordered to be published in the Journal of February 26th, in addition to the usual contents, a detailed list of **SUBSCRIBERS TO THE BENEVOLENT FUND** in the hope of awakening greater interest in this Fund, the benefits of which are extended to the **ENTIRE TRADE**. With this object, the Journal of the above date

WILL BE SENT TO

EVERY CHEMIST AND DRUGGIST

Whose Name appears on the Register, whether residing

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N.B.—An Index to the Advertisements appears in each week's issue.

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3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM JOURN.**" and must be sent only to J. & A. CHURCHILL, 11, New Burlington Street, London, W.

Telegraphic Address, "Churchill, Publishers, London."

N.B.—The Journal is supplied from the publishing office post free to any part of the United Kingdom on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad (excepting India and China), 22*s.*; India and China, *viâ* Brindisi, 24*s.* per annum.

Payment may be made either by **Cash** in a Registered Letter, by **Postal Order**, by **Cheque** crossed London and County Bank, or by **Money Order**, payable at Regent Street, W., to J. & A. CHURCHILL. *Postage Stamps for any amount above Ninepence cannot be received in payment.*

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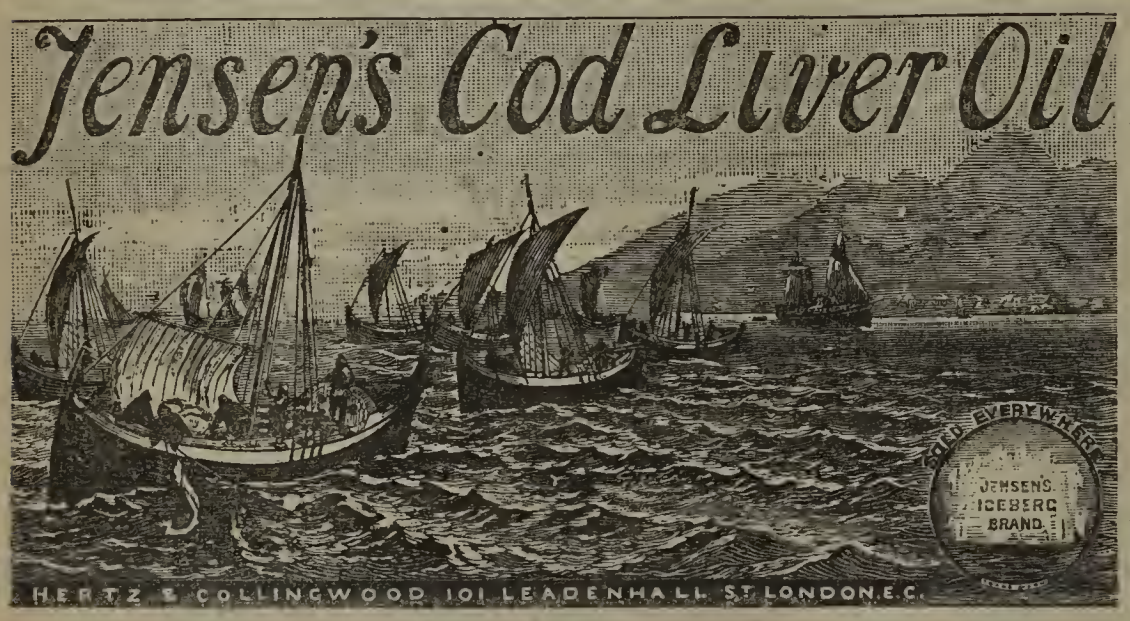

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8	*Pil. Coloc. Co.* (Scam. Virg.) ,, ,,	1 2 0	1 1 0
	Ditto, with Resin Scammony . . .	0 14 0	0 13 0
9	*Pil. Coloc. et Hyos.* (Scam. Virg.) gr. 4 and gr. 5	0 19 0	0 18 0
10	*Pil. Coloc. et Hyos.* (Scam. Virg.) with Resin Scammony	0 14 0	0 13 0
11	*Pil. Ferri Carb.* . . . . . gr. 4	0 5 6	0 4 6
13	*Pil. Hydrarg.* . . . gr. 4 or gr. 5	0 4 9	0 3 9
14	*Pil. Hydr. Subchlor. Co.* . . . gr. 5	0 6 6	0 5 6
15	*Pil. Ipecac. et Scillæ* . . . . gr. 5	0 7 0	0 6 0
17	*Pil. Plumbi c. Opio* . . . . gr. 4	0 11 0	0 10 0
18	*Pil. Quiniæ* . . gr. j. gr. ij. gr. iij.	Subject to mkt. fluctuations.	
19	*Pil. Rhei Co.* . . . . . 4 & 5 gr.	0 5 9	0 5 0
21	*Pil. Scillæ Co.* . . . . . gr. 5	0 5 6	0 4 6

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THE POISON OF THE STINGING-NETTLE.

BY ALFRED W. BENNETT, M.A., F.L.S.,
Lecturer on Botany at St. Thomas's Hospital.

Some considerable time ago I called attention in the columns of this Journal to the unsatisfactory state of our knowledge respecting the fluid which gives the pungency to the stings of our common stinging-nettles, *Urtica dioica* and *urens*, and pointed out the difficulties in the way of accepting the ordinary theory that it is due to formic acid. Dr. G. Haberlandt, in a paper on the "Anatomy and Physiology of Stinging-hairs," read before the Academy of Sciences at Vienna, has now given the *coup de grâce* to this hypothesis, showing that formic acid has no such virulent properties in the minute quantities in which alone it could be present in the stinging-glands of the nettle; and that the irritation must be produced by a fixed substance, since the dried contents of the gland will cause the ordinary effects of a nettle-sting if introduced beneath the skin, while formic acid is, of course, volatile. Dr. Haberlandt finds, on the other hand, invariably in the fluid a substance which possesses all the properties of an albuminoid; it is destroyed by boiling water. The substance which produces the irritation is probably, he considers, of the nature of an unformed ferment.

Dr. Haberlandt's experiments seem to me, valuable as they are, rather to open up more widely than to close this interesting subject, and I commend it to the attention of chemists who have the opportunity of investigating it further.

The mechanical contrivances for the ejection of the poison Dr. Haberlandt found to be similar in our wild stinging-nettles and in the tropical species of *Laportea*, *Loasa*, *Blumenbachia*, *Cajophora*, *Jatropha*, and *Wigandia*, in many of which the virulence of the poison is much greater. In all the sting consists of a multicellular base surmounted by a very large secreting cell. Below the silicified apex of the latter the cell-wall is always very thin. While in our stinging-nettles the brittleness of the recurved apex of the sting is occasioned by the deposition of silica, in *Loasa papaverifolia* the same effect is produced by calcium carbonate, and in *Jatropha stimulata* by the lignification of the cell-wall.

NOTE ON AN EARLY TREATISE ON SOME BRANCHES OF PHARMACY.

BY ROBERT MODLEN.

In the town of Zurich was born (A.D. 1516), of poor parents, Conrad Gesner, a man who became eminent as a physician and writer in many branches of science, especially natural history. He was one of the most indefatigable of men, and Hallam speaks of him as probably the most comprehensive scholar of his age. To quote the words of a recent writer, "Gesner wrote on many subjects; yet his fame rests on his almost incredible achievements in natural history, on which he wrote many volumes, illustrated by thousands of figures drawn by his own hand from specimens in his collection, or executed under his own direction by his assistants. His museum of animals, plants, fossils, etc., brought visitors from all parts, and his correspondence was carried on with the learned men of every nation. When we consider that he accomplished all this while obtaining his living as a physician, that he was always of delicate health, and that he died before reaching fifty, his achievements seem truly wonderful. He died in the scene of his many laborious studies, amongst the objects he had spent his life in collecting,—being carried to a couch prepared for him in his museum. He died A.D. 1565."

Among other works, he wrote a treatise on distilling, called the Treasure of Euonymus, published, of course, in Latin. An English translation, by Peter Morwyng, "Felow of Magdaline Colleadge in Oxford," is in the library of the Pharmaceutical Society, and it is of this book that I purpose giving a brief description.

It is a small volume, of four hundred and eight pages, printed in black letter, and published in 1559 by "John Daie, dwelling over Aldersgate beneath St. Martines." This, it will be observed, was six years before the death of Gesner, thus giving a proof of his celebrity. John Day, it may be remarked, was a celebrated printer of that time, he having printed the folio Bible dedicated to Edward VI., in 1549; Ascham's works; Latimer's sermons; Foxe's Martyrs, etc He was also a publisher, and in his address to the Christian Reader he says, speaking of this book, that "consideringe with myselfe" how useful a thing it is to restore the sick and maintain the whole in their health, and how often the efforts of the best physicians are baffled because their medicines are negligently prepared, "I thought it my part by this my travail and expense somewhat to serve herein thy necessity. Wherfor, I have caused this precious treasure to be translated into our usuall and native language, that like as all men are subject to sickness, so in likewise all men may by this occasion learne the way unto helth."

After this address follows the author's preface, in which he traces the history of distillation from the earliest times, and says that "the Art of Destillation—hath invented many profitable things for man's life, and in Phisicke also certain mervelous thinges, and praiseworthy, if a man prepare them righte and diligentlye. For the lacke of knowledge, covetousness, or negligence of Phisitians and common Apothecaries is the cause why many such preparations are set little by."

Gesner defines distillation as the "drawynge forthe of a thinner and purer humor out of a juice by the force of heate," and gives a description of different kinds. He is particular as to the "bignes" of the furnace, and the quality of the fuel, whether it be green or dry. He seems to have had an idea of fractional distillation, for in speakIng of distilling wines, he says "the foure elementes ascend up in their order; the lightest, subtilst and hoatest first, that is, the fire; secondarily the aire; thirdly water; the earthe remaineth in the bottom."

Frequent traces of astrological influence are observable, as for instance, herbs and flowers ought to be gathered "whyle the mone encreasith."

The book is illustrated by diagrams of the different vessels used in distilling, and plants in common use at the time. These engravings are very fairly executed. Descriptions of many essences are given, with their properties and uses. Among others the celebrated Aurum Potabile is fully described. The following account of chicory water may be taken as a fair specimen:—"Intybum, endive: the water coleth all hotte diseases; and all burnynge of fyre, or water hoote, it healeth them if they be wash therewith. It is good also for quotidian agewes, and obstructions of the bowels, both druncke and mynistred outwarde."

A very interesting circumstance is that Gesner mentions koumiss. "The liquor of milke distilled, the chymistes and destyllers do use. It is a wonder that men say, amongst the Tartareans, water distilled of milke doth make men dronke. The milke must therefor be somewhat thicker, and tary somewhat long upon the fyre. Whiche thing peradventure chaunceth in meare's milke."

A recipe for "Aqua Vitæ against the Pestilence" contains, among a great variety of other things, pearls, jacinths, coral, unicorn's horn, etc.

As might be expected Gesner quotes largely from Raymond Sully, Albertus Magnus, "Giber a chymist," and other old writers.

Such is a short account of this interesting old book, which has evidently been in its time a reference book in some laboratory, bearing as it does some few stains, and having MS. notes and underlined passages. It is to be regretted that this copy is not in the original binding.

Gillingham, Chatham.

NOTE ON "INSECT POWDER."*

The Dalmatian insect powder, *Chrysanthemum cinerariæfolium*, B. et H., known also by its Dalmatian name *buhach*, has been cultivated for several years past on a large scale in certain portions of California, the cultivators being Dalmatians who have settled there.

The best soil for this plant is loam with a large proportion of sand. This kind of soil is particularly suitable for sowing, but it should be well mixed with old dung. The seed itself is mixed with sand and distributed over the soil as uniformly as possible, after which the soil is raked to the depth of about half an inch, and then gently pressed by passing a roller over it. Until the plants spring up, the beds must be irrigated every evening, unless it rains. But great care must be taken not to overdo it, as the plant is very sensitive, throughout its whole life, towards undue moisture of the soil. After the plants have sprung up, they need not be watered more than twice a week. Weeds must be kept away until transplantation takes place, which occurs when the plant is about six inches high. It is then set out precisely like cabbage, about twenty inches distant from every neighbour, and afterwards needs no further attendance.

Buhach is a biennial [?] plant, therefore it flowers in the year subsequent to that of sowing. The flowers must be cut off just when they are about to open, as they contain the largest amount of essential oil in this condition. The cut flowers must be carefully guarded against dampness, and must be dried in the shade, never by exposure to the sun or to artificial heat. After the period of flowering is over, the plants are cut off four inches over the ground, reduced to powder, and this powder mixed with that of the flowers, in a proportion not exceeding 1 part of the former to 2 parts of the latter. [This is the statement made by the author of the work from which we quote. It is made in such a manner that it appears to be the regular process followed, there being no intention at all to utilize the flowers alone.] The finer the mixed powder of herb and flowers is, the more effective will it prove to be. If any one wishes to prepare the powder himself, and does not possess a suitable mill, he may use a mortar covered with leather. The quantity thus worked in a mortar should, however, not exceed about one pound, to avoid heating the powder. When the substance appears to be comminuted, it is transferred to a fine hair-sieve, and the refuse remaining on it put back in the mortar. It is very difficult to reduce the stems to powder in this manner, which—as the author naively but truly states—is not a serious disadvantage, as the flowers are the most valuable portion of the plant. Insect powder should be preserved in glass or metallic vessels, which should be closed air-tight.

Insect powder may be used either in form of dry powder, or by fumigation, or in form of alcoholic extract, or mixed with water, or in form of infusion.

The work from which we quote advises to make the first-mentioned method of using insect powder cheaper by mixing it with flour, saw-dust or wood-ashes, which do not interfere with the insecticidal powers. [Of course, this may be done by the user of the powder, provided the dilution is not carried too far.] The mixture ought to be made at least twenty-four hours before it is to be used, and should meanwhile be kept in air-tight vessels. Experiments have been made which show that such mixtures acquire greater efficiency by keeping. It was found, for instance, that a mixture of one part of insect powder and 11 parts of flour, applied, immediately after being mixed, to certain caterpillars, was just sufficiently strong to kill them. But the same effect was produced by applying to them a mixture of 1 part of insect powder and 22 parts of flour which had been mixed twenty-four hours before. [The explanation of this may be that the volatile oil of the flowers probably becomes more thoroughly diffused through the mixture in the course of time.—*Ed. Am. Dr.*]

The employment of insect powder by way of fumigation is exceedingly effective, particularly in closed rooms, where the dense smoke produced by it, which is not at all disagreeable to human beings, soon kills all insects, particularly those having tender or soft bodies. This method is especially valuable for the purpose of killing mosquitoes in rooms. All that is necessary is to place a burning coal in a spoon or other receptacle, and to sprinkle insect powder upon it. In larger rooms, the spoon may be carried about, or several may be thus used in order to distribute the fumes properly. After a few minutes, every mosquito will be found dead; and, if the fumigation be kept up for about half an hour, the same fate will have overtaken also—according to the author—any fleas that might have been present. [He says nothing of bed-bugs, but it is certainly worth while to try the above method for getting rid of this troublesome pest, which is spreading gradually into houses of opulence and comfort, where such disgusting visitors had been previously unheard of.—*Ed. Am. Dr.*]

The third method of employment in form of alcoholic extract is the most advantageous for use in the fields and garden.

The principal drawback connected with the use of insect powder is this, that its effect, when applied in substance, is only certain when it comes in actual contact with soft-bodied insects. In the case of hard-bodied or haired insects it often produces only stupefaction for a time. This drawback is to a great extent removed by employing the alcoholic liquid extract, which may be prepared by percolation, or, according to the author, by macerating one pound of insect powder for four or five days with two pints of alcohol in a warm place, then separating the alcohol and adding 1 pint of glycerin. This liquid extract is to be diluted with water before use. For hard-bodied insects it may be diluted with 20 parts, for more sensitive insects with 30 to 40 parts of water. If it is to be used out of doors, it is self-evident that it should not be applied while rain is threatening, nor during the hot part of the day. The best time is early in the morning while the dew is still on the ground or during cloudy days.

If a decoction of insect powder is desired, this may be readily made by pouring boiling water upon it and macerating in a covered vessel until cold.

In many cases a simple mixture of insect powder and water will be found quite effective. A good proportion is, according to the author, one-half ounce to two gallons. [This seems to be altogether too weak.]

The decoction, however, is much more effective. It must be used as soon after preparation as possible, and at a time when its effect will not be interfered with by the condition of the atmosphere.

It should be stated that the majority of insects do not die immediately after having come in contact with insect powder or one of its preparations. They are at first only stupefied, but death usually ensues after a few hours, and in some cases not until after several days.

* Abstract of a chapter on the subject in 'Die Tropische Agrikultur. Ein Handbuch für Pflanzer und Kaufleute.' Von Heinrich Semler in San Francisco. 8vo. Wismar, 1886, vol. i., pp. 207. Reprinted from the *American Druggist*, January.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 5, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE REGISTERS AND THE REGISTRAR'S REPORTS.

THE Reports on the Registers of Pharmaceutical Chemists and Chemists and Druggists and on the Numerical Strength of the Pharmaceutical Society, presented by the Registrar and Secretary to the Council at its meeting on Wednesday last, afford the usual annual opportunity of referring to the conditions under which pharmacy is practised in Great Britain, so far as these are disclosed by official statistics. In the first place it is noteworthy that the Register of Chemists and Druggists for 1887 contains 120 names less than that for the previous year, the number being 13,447, of which 2198 are those of persons who are also pharmaceutical chemists, against 13,567. This difference does not, however, represent correctly the balance for the last year, since the decrease is largely due to the steps taken recently to free the Register from two years' accumulations of entries that had become incorrect through deaths or removals, which led to the erasure of no less than 298 names. A more correct idea as to the strength of the Register relatively to former years is obtainable by making the comparison with the report presented in February, 1885, immediately after a similar expurgation, when the total number of entries on the general Register of Chemists and Druggists was 13,400, so that in two years the number of qualified chemists and druggists in Great Britain has increased by 47. The increase has not, however, extended to both classes included in that register, since there were 37 fewer pharmaceutical chemists at the commencement of the present year than at the beginning of 1885, the number being 2198 against 2235. This regrettable decrease is of course due to the inadequacy of the number of persons passing the Major examination to compensate for the losses from this class through deaths of both examined men and those who became pharmaceutical chemists without examination before 1852. So far as concerns the entries of examined pharmaceutical chemists, which now number 1621, or nearly three-fourths of the whole class, these show a steady increase, there being now 51 more than two years ago. But the extent to which the returns are affected by erasures of *ante* 1852 entries, of which there are still 577 on the Register of Pharmaceutical Chemists, is indicated by the fact that in the last two years these erasures have numbered 88, or within 6 of the total number of Major passes during the same time.

Of course the increase in the proportion of examined pharmaceutical chemists, just referred to, is more than equalled by the increase in the number of entries on the general Register of Chemists and Druggists of persons possessing the Minor qualification, the total of which now reaches 5675. Considerable as this number is, it may surprise many to observe that it still falls far short of the total of entries of unexamined persons who were registered in virtue of having been in business before the passing of the Pharmacy Act, 1868. On the other hand, some will hardly be prepared to see that two out of every seven persons who possess the Minor qualification have also passed the Major examination. The figures are given in the following table :—

	January 1, 1886.			January 1, 1887.		
	Number.		Per cent. of entire Register.	Number.		Per cent. of entire Register.
Pharmaceutical Chemists :—						
Examined . .	1581	2219	11·65	1621	2198	12·05
Non-examined	638		4·70	577		4·29
			16·35			16·34
Chemists and Druggists who have passed the Minor only . .	3980		29·33	4054		30·14
Remainder, including those who have passed the Modified . .	7368		54·22	7195		53·52
Total	13,567		100·00	13,447		100·00

Turning now to the report on the numerical strength of the Pharmaceutical Society, it will be seen that there has been a decrease in the number of Members. This is the case not only with "Chemist and Druggist Members," the decrease of which is inevitable, and must continue, until this class becomes extinct; but it is also true of "Pharmaceutical Chemist Members." The latter decrease, amounting to 51, is no doubt regrettable, but it is attributable principally to the cause before referred to as accounting for a decrease in the entries on the Register of Pharmaceutical Chemists, namely, that the number of persons passing the Major examination is not equal to the death rate among the examined and non-examined of that class combined. In fact, the position is here intensified, since every erasure of the name of a person not possessing the Major qualification from the Register of Pharmaceutical Chemists must represent the loss of a member of the Society. With respect, however, to the important class of Associates in Business the returns are more satisfactory. Here there has again been an increase, the number being 1281 against 1261. The Associates not in Business have also increased from 887 to 899. On the other

hand the number of Apprentices has fallen from 1220 to 1194. The exact numerical relation of the Pharmaceutical Society to the body of chemists and druggists is shown in the following table:—

	January 1, 1886.		January 1, 1887.	
	No.	Per cent of whole.	No.	Per cent of whole.
Pharmaceutical Chemists, Members of the Society .	1809	82·52	1758	80·00
Other Registered Chemists and Druggists connected with the Pharmaceutical Society	2874	—	2874	—
Total of Pharmaceutical Chemists and Chemists and Druggists connected with the Society . . .	4683	34·52	4632	34·52
Registered Apprentices subscribing to the Society .	1220	--	1194	—

Although the aspirations of those who wish to see the Pharmaceutical Society become numerically more representative of the entire body of chemists and druggists will hardly be satisfied with the stationary position revealed in the curious identity of the figures representing the percentage relation with those of last year, we think it is fair subject for congratulation that the Society has in this respect maintained its position through a period that has proved at least embarrassing to more than one other voluntary association.

The report of the Council proceedings in the present number will furnish gratifying information to many of our readers who have taken an active part in the endeavour to stimulate progress towards the establishment of a better system of pharmaceutical education. The Bill that has been drawn up with that special object by the Law and Parliamentary Committee has now been unanimously adopted by the Council, and the Committee has been instructed to take the necessary steps for its introduction into Parliament. These steps mark an important epoch in the history of the Society, and we cannot doubt that they will commend themselves to the sound judgment and approval of the majority of pharmacists in this country as having been instigated by a thorough appreciation of the necessities of the case, and by an earnest desire to improve the position and prospects of those who engage in the pursuit of pharmacy.

* * *

We take this opportunity of reminding members of the Society that the evening meeting will take place on Wednesday next, the 9th inst., and that the chair will be taken at eight o'clock precisely. The official notice (which appears in the advertisement columns of the present number) states that some important donations to the Museum, recently received from the Colonial Commissioners, will then be exhibited and described by the Curator. The paper to be read on this occasion will deal with the subject of the tests of quinine sulphate, to which much attention has been directed lately; also, notes on the determination of caffeine, and on cocaine hydrochlorate.

* * *

We are glad to notice that the re-organization of the Scottish Branch of the Pharmaceutical Society is about to be followed up by the resumption of the evening meetings in Edinburgh, and that the first meeting for the Session is announced to take place on the 16th inst., at the Society's House in York Place, when a paper will be read by Mr. Dott on "The Evidence for the Existence of Acid Morphine Meconate." We congratulate our Scottish friends on this renewal of their activity in the promotion of pharmaceutical interests.

* * *

Sir John Lubbock has lost no time in introducing into the House of Commons his "Bill to provide for the earlier closing of Shops, and to make further provision with respect to trading on Sunday." It provides that, subject to the provisions of any order made by a local authority in accordance with the Act, all shops except those mentioned in the schedule—licensed victuallers', refreshment houses, tobacconists' shops and news agencies—shall be closed not later than ten o'clock in the evening on Saturday, or one other day in the week appointed in lieu of Saturday by the local authority, and not later than eight o'clock in the evening on every other day of the week. An exception is made in respect to the evening before public and bank holidays. But the order of the local authority referred to, based upon an application signed by two-thirds of the shopkeepers, may authorize an extension of the time, or, on the other hand, may order shops not scheduled to be closed not earlier than two o'clock on one day of each week. There is a saving clause for pharmaceutical chemists and chemists and druggists, providing that they shall not be liable to any fine under the Act for supplying medicines, drugs, or medical appliances after the hour appointed; but the provision is not to be deemed to authorize a pharmaceutical chemist or chemist and druggist to keep open shop after the specified hour.

* * *

In reference to the objection raised by Mr. Allen (before, p. 623) to the statement in the report of the Law Committee of the Chemists and Druggists' Trade Association (before, p. 597) that a summons, issued and afterwards withdrawn by the Sheffield local authorities, applied to "850 spirit of nitre," Mr. Haydon writes to say that this description of the article in question was based upon the representation of the vendor and of Professor Attfield, who certified that its specific gravity was ·849.

* * *

Mr. Haydon informs us that his personal canvas of the London wholesale trade on behalf of the Chemists and Druggists' Trade Association has resulted in the subscription of fifty-five guineas, which, in addition to other contributions, brings the amount collected up to £299 15*s*. This shows a fair appreciation of his energy in some quarters, upon which we congratulate him; but the future hopes of the Association will, nevertheless, depend more upon the extent to which half-crowns are sent in by those members of the trade which the Association seeks to represent.

* * *

We regret to record the sudden death of Mrs. Anne Horncastle, who in December last was elected an Annuitant on the Benevolent Fund.

* * *

On Monday next, the 7th inst, a meeting of the London Section of the Society of Chemical Industry will be held in the Chemical Society's Rooms.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, February 2, 1887.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. THOMAS PRESTON GOSTLING, VICE-PRESIDENT.

Messrs. Allen, Atkins, Baildon, Borland, Bottle, Butt, Cross, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Southall, Symes, Williams and Woolley.

The minutes of the previous meeting were read and confirmed.

Members of the Council who Retire.

The lot having been taken in the usual manner to determine the seven members of the Council who should retire in May next, the following names were drawn:—

Baildon.	Savage.	Symes.
Borland.	Southall.	Williams.
Cross.		

The following who remained in by lot last year now retire by rotation:—

Atkins.	Hampson.	Richardson.
Butt.	Hills.	Robbins.
Carteighe.		

The following seven remain in office another year:—

Allen.	Greenish.	Schacht.
Bottle.	Radley.	Woolley.
Gostling.		

Diploma.

David Robb, being duly registered as a pharmaceutical chemist, was granted a diploma stamped with the seal of the Society.

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Dickson, James Currie ... .London.
Fleetcroft, John Frederick.....Chester.
Johnston, William ....London.
Pinder, Robert.....London.
Reade, Leonard James .....Wolverhampton.
Smith, John Henry .....Leamington.
Turney, John Davy.....Plymouth.

ASSOCIATES IN BUSINESS.

The following, having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Arthur, John .....Great Yarmouth.
Black, Thomas.....Hoyland Nether.
Fitton, George Webster .....Hertford.
Fitton, Robert .....Huddersfield.
Green, Edmund Clement F. ...Frome.
McDerment, James.....Ayr.
Oldfield, Manton.....Erith.
Preece, Charles Godwin .....Bildeston.
Shallcross, Joseph Richard.....Hadleigh.
Smith, Norman Sellers .....Colyton.
Tocher, James Fowler.....Peterhead.
Weller, James Mills.....Long Stratton.
Willcocks, Arthur Squire .....Datchet.
Williams, Alfred Griffiths .....Newport (Mon.).

Modified.

Wilson, Franklin.....Hull.

ASSOCIATES.

The following having passed the Minor examination and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Ashton, George .....Buxton.
Brown, Charles.....London.
Butterfield, Frederick Victor...Thirsk.
Cooper, Edwin .....Lincoln.
Garnett, James.....Kendal.
Grierson, George Arthur.....Edinburgh.
Johnson, Leonard .....Aiskew.
Melvin, George.....Aberdeen.
Troughton, Reginald .....Edinburgh.
Webber, James Wilkey .....Taunton.
Want, William Phillip .....Lee.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Antcliffe, Herbert .....Sheffield.
Back, Charles Thomas .....London.
Bartlett, Percy John .....London.
Brown, Walter Sims .....Caistor.
Cammack, Jno. Francis Jeffrey.London.
Cannell, Annie Elizabeth .....Wolverhampton.
Carré, Arthur Bishop .....Guernsey.
Carruthers, Ernest Murray.....Cambridge.
Chalmers, Franklin.....Devizes.
Chambers, John Wm. Parsons..Derby.
Chudleigh, Thomas Morcom ...Liskeard.
Clayton, Walter F. .....London.
Cocker, Harris .....Earlsheaton.
Colman, William .....Manchester.
Cooper, John Henry .....Loughborough.
Davidson, James .....Gateshead.
Davison, Daniel .....Cromer.
Dean, John Thomas.....Haslingden.
Douglas, William.....Dalry.
Ellis, David ....Ellesmere.
Eynon, Charles James.....Leamington.
Fardon, Arthur Edwin ..... Bristol.
Fieldsend, Arthur .....Penistone.
Garnett, Henry..... .....Evesham.
Goodman, Josiah .....London.
Guttridge, Gladstone .....Nottingham.
Hancock, Fred .....Oldham.
Harburn, John English .....Whitby.
Harris, Frank Anderson .....Worksop.
Hulme, Thomas ....Manchester.
Hurlston, Alfred Frederick ...Coventry.
Hutchinson, Alfred .....Nottingham.
Jewell, Alfred Furniss.....Grantham.
Jones, Charles Edward .....Liverpool.
Jones, Hugh Kyffin.....Mochdre.
Jowett, Hooper Albert D. .....Lancaster.
Kent, William Hy. Plaisted ...East Molesey.
Kneale, James Coole .....Douglas.
Langford, Frederick Charles ...London.
Lewis, Richard George .....Carmarthen.
Lloyd, William Morgan .....Maldon.
Loveluck, Griffith David.....Taibach.
Mackenzie, Stewart Murdoch...Musselburgh.
Martin, John .....St. Stythians.
Merson, George .....Fraserburgh.
Milbank, Sydney Thomas .....Bishop Stortford.
Mitchell, Walter Stuart .....Gloucester.
Olds, George ....Farnboro' Station.
Parry, Thomas .....Sandgate.
Pattinson, Hedley.....Haltwhistle.
Pattinson, William ..... Hexham.
Playfoot, Frederic Hubert.....Leamington.
Ponsford, Alfred .....Newton Abbot.
Pritchard, Elias Roberts..... Aberdaron.

Roe, Edwin John.....Nottingham.
Sagar, Robert Thompson .....Halifax.
Sapwell, Cecil Guy Columba ...London.
Scott, Thomas Lamb .....Hetton-le-Hole.
Seedhouse, William .....Cambridge.
Smith, Frederick .....London.
Spence, Alexander .....Linlithgow.
Taylor, Frederick Kaye .....Bradford.
Taylor, Thomas Morley .. ..Bath.
Thomas, Dan .....Hafod.
Upson, Arthur ....Southampton.
Whiteley, George.....York.
Winn, William Wilford .....Great Ayton.
Woodland, William..... .....Selhurst.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

The Registrar's Report.

The Registrar's annual report, showing the numerical strength of the Society, the statistics of the examinations, and the state of the Registers, was laid on the table. It was ordered to be entered on the minutes and published. It is printed at pages 632 and 633.

Reports of Committees.

FINANCE.

The report of this Committee was received and adopted on the motion of the President, and various accounts were ordered to be paid.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants :—

£5 to the widow (aged 50) of a registered chemist and druggist. Applicant has had one previous grant of like amount. (Wiltshire.)

£5 to a registered chemist and druggist (aged 55) who has a wife and two daughters dependent on him, and is unable to get employment. Has had six previous grants. (Somerset.)

£15 to the widow (aged 68) of a registered chemist and druggist, an unsuccessful candidate at the late election. (Lancashire.)

Two cases had been deferred for further inquiries, and one had not been entertained.

It was recommended that in the future successful applicants for aid should be informed of the amount and conditions of the grant.

The Vice-President, in moving the adoption of the report, remarked on the few applications for relief which had come forward during the past month, which he hoped showed a better state of things amongst their friends.

The Council went into committee to discuss the last paragraph of the report, the result of which was that the paragraph in question was struck out, the matter being left in the discretion of the Committee.

With this alteration the report and recommendations were unanimously adopted.

LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

Library.

The report of the Librarian had been received, including the following particulars :—

	Attendance.	Total.	Highest.	Lowest.	Average.
December .	Day . . .	293	24	1	12
	Evening .	136	18	2	8
Year 1886 .	Day . . .	4724	39	1	16
	Evening .	1649	18	0	8

Circulation of books.	Town.	Country.	Total.	Carriage paid.
December . .	108	112	220	£1 10 8
Year 1886 . .	1277	1507	2784	20 15 9

The undermentioned donation to the Library in London had been received, and the Committee recommended that the usual letter of thanks be sent to the donor :—

Helmsing (L.), Ueber den Nachweis des Cocaïns im Thierkörper, 1886. From Professor Dragendorff.

The Committee recommended the purchase of the undermentioned works :—

For the Library in London—

Medical Press and Circular.
Fox, Sanitary Examinations of Water, Air, and Food, 2nd ed., 1886.
Tuson, Veterinary Pharmacopœia, 4th ed., 1886.
Faraday, Chemical History of a Candle, new ed. 1886.
Taylor, Sagacity and Morality of Plants, 1884.
Strasburger, Handbook of Practical Botany, 1887.
Hehn, Wanderings of Plants and Animals, 1885.
Friend, Flowers and Flower-lore, 2nd ed., 1884.
Stillé and Maisch, National Dispensatory, 4th ed., 1886.
Schmiedeberg, Elements of Pharmacology.
Vierteljahresschrift über die Fortschritte auf dem Gebiete der Chemie der Nahrungs- und Genussmittel.

For the Library in Edinburgh—

Dittmar, Analytical Chemistry.
Lubbock, Flowers, Fruits and Leaves.

Museum.

The Curator's report had been received, and included the following particulars :—

Attendance during December.	Total.	Highest.	Lowest.	Average.
Morning .	260	26	2	11
Evening .	67	14	1	3

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

Specimen of Spurious Opium.
From Messrs. Battley and Watts.

Specimens of Bergamot Oranges.
From Sir J. B. Lawes.

Specimen of Pure Crystallized Aconitine.
From Messrs. Hopkin and Williams.

Specimens of the Root of *Lachnanthes tinctoria* and of "Khatai" root.
From Messrs. T. Christy and Co.

Specimen of Strophanthus Pods.
From Mr. J. W. Moir.

Specimen of Dagga.
From Messrs. Burroughs and Welcome.

Specimen of Aloes Wood and of the Wood of *Erythroxylon monogynum*.
From Surgeon-General G. Bidie, Madras.

Herbarium specimen of the Japanese Menthol Plant.
From Messrs. Cocking and Co., Japan.

The following donations to the Society's Museum in Edinburgh, had been reported by Mr. J. Rutherford Hill, Assistant Secretary :—

Specimen of Calcite in fine crystals.
From Mr. J. Sharp, Edinburgh.

Specimen of Antifebrin.
From Messrs. Symington and Fraser, Edinburgh.

Specimens of Aluminium Aceto-tartrate; Aluminium Aceto-glycerinite; Ammonium Sulpho-icthyolate.
From Mr. James Jack, Cork.

An application for a grant of specimens of medicinal plants and of specimens of materia medica had been received from the Secretary of the Oldham Chemists' Assistants and Apprentices' Association, and the Curator had been directed to supply the specimens required, as far as possible, from the duplicates in the Museum Department. Letters of thanks had been received from the Principal of Owens College, Manchester, for duplicate specimens of British Guiana drugs, and from the Secretary of the Torquay Chemists' Assistants' Association, for the loan of a series

of specimens illustrating the official cinchona barks, and the methods of collecting it.

The Professors had attended, and reported on their respective classes.

The report of Mr. J. R. Hill, Assistant Secretary in Scotland, on the various departments under his care during the past year, had been submitted to the Committee, and was considered very satisfactory. It was recommended that the Museum in Edinburgh be supplied with a complete set of official chemical substances.

The PRESIDENT, in moving the adoption of the report, remarked on the very satisfactory nature of the report sent by Mr. Hill with regard to the Museum and other property of the Society in Scotland. The resources which the Society had placed at the disposal of members in the North, in giving them a new house, with room for a good library and ample specimens, had been highly appreciated, as shown by the very large attendance of students and members.

The motion was unanimously agreed to.

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor, stating the progress of cases which had been placed in his hands.

James Furniss, 80, South Street, Park, Sheffield, had paid into Court two penalties sued for, and costs.

Israel Nuttall, Horwich, near Bolton, had paid into Court a penalty and costs, for illegally using the title chemist and druggist.

T. Hudspith, 7, High Street, Langley Moor, near Durham, had been ordered to pay two penalties and costs on the higher scale.

The Committee had further considered a case which had previously been before it, and recommended that proceedings be taken. In another case further consideration had been deferred.

The Council went into committee to consider the report. On resuming, the report and recommendations were adopted.

LAW AND PARLIAMENTARY.

This Committee had approved with one verbal alteration a draft Bill, as drawn by the Solicitor with the assistance of the President, and now submitted it to the Council for adoption in the following form:—

A Bill intituled a Bill to Amend "The Pharmacy Act, 1852," *and "The Pharmacy Act,* 1868."

Whereas it is expedient to further secure that persons known as chemists and druggists should possess a competent practical knowledge of their business:

Be it enacted by the Queen's Most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal and Commons in this present Parliament assembled, and by authority of the same as follows:

1. The powers of the Act, passed in the fifteenth and sixteenth years of the reign of Her present Majesty, intituled, an "Act for Regulating the Qualification of Pharmaceutical Chemists," and of "The Pharmacy Act, 1868," with respect to examinations required for obtaining certificates of qualification under the said Acts, or either of them, shall be extended so as to provide for the division of the said examinations into Preliminary and other parts of the same; also for periods of time and study between any of the said parts; also that persons presenting themselves for a final part of an examination shall have deposited with the Registrar under the said Acts certificates of their having duly attended courses of instruction in chemistry, botany, and materia medica, and having for not less than three years in the whole served in the capacity of apprentices or pupils in the open shops of chemists and druggists.

2. It shall be lawful for the Pharmaceutical Society of Great Britain from time to time, by bye-laws duly confirmed, to regulate the said division of examinations and also the said periods of time and study between any of the said parts, also to allow and provide for and to regulate the reception of certificates issued by other examining bodies in lieu of or so as to satisfy the examiners in lieu of the preliminary part of any examination, also to prescribe the courses of instruction in chemistry, botany and materia medica to be duly attended as aforesaid, also forms of certificates to be for any purpose of this Act deposited with the said Registrar, and also notices to be given and fees to be paid by persons intending to present themselves for examination or any part of an examination, or desiring any registration under the said Acts or either of them, and it shall at all times be lawful for the Council of the said Society by resolution, on being satisfied by a certificate of a Committee of the same Council that any person therein named has acquired, whether in England or Scotland, or elsewhere, competent practical skill and knowledge in and of the business of a chemist and druggist, to waive and dispense with the whole or any part of the said term of three years or any period of time aforesaid, and any evidence of having attended any such courses of instruction as aforesaid in relation to the person therein named.

3. This Act shall not extend to Ireland.

4. This Act shall come into operation on the first day of January, one thousand eight hundred and eighty and may be cited for all purposes as "The Pharmacy Acts Amendment Acts, 1887."

The PRESIDENT moved the adoption of the report.

Mr. WILLIAMS asked if the acceptance of the report would involve proceedings in Parliament.

The PRESIDENT said that would form the substance of a subsequent resolution, but of course, if this resolution were adopted, the other would follow. The Committee had carried out the duty imposed upon it by the Council, of drafting a Bill which would enable the Society by bye-laws to frame certain schemes of compulsory education before examination. It must be understood that this Bill was not in itself a scheme, and did not commit the Council to any particular scheme. It simply asked Parliament to give the Council power to make bye-laws, which would afterwards have to be framed for the purpose. In that case, not only must the Council go through certain formalities, but the proposed Bye-laws must be approved by the members, and afterwards confirmed by the Privy Council. Some persons were, he believed, under a little misapprehension as to that. When application was made twelve months ago for confirmation of the Bye-laws to the Privy Council, the reply was that the powers of the Act of 1868 were not wide enough, and the Council had decided by a resolution passed in November last that it was desirable to seek for these powers. That resolution limited the scope of the work, and the Committee was instructed to draft a Bill on educational lines, and not to introduce matter which might be the subject of contention. It was not necessary to adduce any arguments on the merits of the Bill beyond calling attention to the fact that it was an enabling Bill, not a scheme which would come into operation without a number of other processes to which the consent of the Society, as well as the members of a future Council, would have to be obtained.

Mr. SCHACHT seconded the motion.

Mr. RADLEY said he saw it was proposed to give power to waive the period of three years' pupilage; he supposed that had been well considered.

The PRESIDENT said, Yes. In the case of all bodies to whom wide powers were given with regard to examinations and education it was customary to have some means of dealing with exceptional cases; for instance, in the case of the Incorporated Law Society all the conditions under which an articled clerk entered the law were laid down in an Act of Parliament, the term of pupilage, the certificates of examining bodies which were accepted in lieu of a certain period of service, and so on; but there was power placed in the hands of the judge to waive all those conditions if he thought fit. It had been thought desirable in this case

REGISTRAR'S REPORT.

MEMBERS, ASSOCIATES, AND APPRENTICES OF THE SOCIETY FOR THE YEAR 1886.

	Life Members.		Subscribing Members.		Associates in Business.	Associates not in Business.	Apprentices.
	Pharmaceutical Chemists.	Chemists & Druggists.	Pharmaceutical Chemists.	Chemists & Druggists.			
Number in 1885	225	2	1584	724	1261	...	...
„ restored, 1886 ...	...	...	2	2	5	...	...
„ elected, 1886 ...	...	...	44	6	121	...	...
	225	2	1630	732	1387	...	...
Deaths, Secessions, etc. ...	9	...	88	40	106	...	...
Total Strength of the Society	**216**	**2**	**1542**	**692**	**1281**	**899**	**1194**
Summary:—							
1885	225	2	1584	724	1261	887	1220
1886	216	2	1542	692	1281	899	1194
Increase	...	...	...	...	20	12	...
Decrease	9	...	42	32	...	...	26

COMPARATIVE STATEMENT OF THE NUMERICAL STRENGTH OF THE SOCIETY FOR 5 YEARS: 1882-86.

MEMBERS.—PHARMACEUTICAL CHEMISTS.

	1882	1883	1884	1885	1886
Restored to Membership ...	8	10	4	8	2
Elected „ ...	35	50	52	50*	44
(Total additions) ...	43	60	56	58	46
Deaths, Secessions, etc. ...	92	74	71	91	88
Decrease ...	49	14	15	33	42
Total Number of Subscribing Members	**1646**	**1632**	**1617***	**1584**	**1542**

MEMBERS.—CHEMISTS AND DRUGGISTS.

	1882	1883	1884	1885	1886
Restored to Membership ...	3	2	6	6	2
Elected „ ...	15	14	16	8	6
(Total additions) ...	18	16	22	14	8
Deaths, Secessions, etc. ...	27	33	43	29	40
Decrease ...	9	17	21	15	32
Total Number of Subscribing Members	**777**	**760**	**739**	**724**	**694**

ASSOCIATES IN BUSINESS.

	1882	1883	1884	1885	1886
Restored	4	5	3	8	5
Elected	115	138	114	113	121
(Total additions) ...	119	143	117	121	126
Deaths, Secessions, etc. ...	81	72	61	94	106
Increase ...	38	71	56	27	20
Total Number of Associates in Business	**1107**	**1178**	**1234***	**1261**	**1281**

ASSOCIATES NOT IN BUSINESS.

	1882	1883	1884	1885	1886
Increase ...	7	3	7	53	12
Decrease ...	...	...	...	...	...
Total Number of Associates not in Business	**824**	**827**	**834**	**887**	**899**

APPRENTICES OR STUDENTS.

	1882	1883	1884	1885	1886
Increase ...	...	61	58	64	...
Decrease ...	9	...	...	...	26
Total Number of Apprentices or Students	**1037**	**1098**	**1156**	**1220**	**1194**

LIFE MEMBERS.

	1882.	1883.	1884.	1885.	1886.
Pharmaceutical Chemists	**236**	**229**	**228**	**225**	**216**
Increase	...	...	...	...	...
Decrease	2	7	1	3	9
Chemists and Druggists	**2**	**2**	**2**	**2**	**2**

* 1 who paid in 1884 as an Associate in Business, afterwards passed the Major, and was elected a Member in the same year.

ANALYSIS OF EXAMINATIONS FOR THE YEAR 1886.

FIRST OR PRELIMINARY EXAMINATION.

Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year	Average Number of Candidates at each Examination.	Average Number of Rejections at each Examination.	Percentage of Rejections.
1305	632	673	4	326·25	168·25	51·57

MAJOR, MINOR, AND MODIFIED EXAMINATIONS.

ENGLAND AND WALES.

Number of days on which the Board met for conducting the Major, Minor, and Modified Examinations... 30
Average attendance of the Members of the Board of Examiners at each Meeting 15

Examinations.	Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of Rejections at each Meeting.	Percentage of Rejections.
Major	90	51	39	6	15·00	6·50	43·33
Minor	824	304	520	6	137·33	86·66	63 10
Modified	2	0	2	2	1·00	1·00	100·00

SCOTLAND.

Number of days on which the Board met for conducting the Major, Minor, and Modified Examinations... 19
Average attendance of the Members of the Board of Examiners at each Meeting 8

Examinations.	Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of Rejections at each Meeting.	Percentage of Rejections.
Major	8	5	3	4	2·00	0·75	37·50
Minor	246	94	152	4	61·50	38·00	61·78
Modified	1	1	0	1	1·00	0·00	0·00

THE REGISTERS OF PHARMACEUTICAL CHEMISTS AND CHEMISTS AND DRUGGISTS, 1886.

Additions during the year:—

Number of persons who have passed the—		
Modified Examination		1
Minor Examination.....		398
Major „	56*	
Number of persons registered on payment of the Registration Fee, having been in business before August 1, 1868.....		10
Number of persons restored to the Register on payment of a fine		19
Decrease of numbers on the Register		120
		548

* These having already been included in the number who passed the Minor, do not increase the numbers on the Register.

Erasures during the year:—

Deaths:—		
Notices from Registrars		167
Other sources		75
Erased at the request of registered persons themselves.....		8
Erased by the Registrar in pursuance of the provision set forth in Section 10 of the Pharmacy Act, 1868, after sending two registered letters to which no answer has been given...		298
		548

Number of Pharmaceutical Chemists on the Register, December 31st, 1886	2,198	
„ „ Chemists and Druggists	11,249	
		13,447

by the Solicitor as well as by the Committee that there should be a power of dispensing under certain conditions with this period. For instance, a man very highly qualified, say in Australia, might come and wish to be examined, and if he produced evidence of having studied and had practical experience over there the Council might waive the three years' term in this country. Similarly, with regard to Ireland. It would be desirable that there should be in any scheme of the kind a committee of the Council to deal with special cases.

Mr. SCHACHT wished to particularly endorse what had been said by the President in reference to the limited scope of this resolution. He perfectly agreed with him that it only enabled the Council to do something in the future, and as he had been a little identified in the past with certain ideas as to what should be the course adopted, he wished to say that they having been for a time altogether put aside by the decision of the Privy Council, he should now enter on the matter, supposing this Bill were passed, with an entirely free mind, with no desire to take advantage of what had been done in the past, further than to reap what experience he had from the previous investigation on the subject. In asking for this Bill the Council would be simply asking for powers, and it in no way pledged the Council to any definite scheme.

Mr. SYMES said there were some who, though they strongly approved of the Bill still thought that other things also were required, but he understood they were not on that occasion to discuss those matters. There was one point, however, he should like to put. When this Bill got into Parliament, although promoted for a simple object quite outside controversy as was believed, was it not possible that certain Members of Parliament, who might have certain things in mind which might be matters of controversy, might introduce them into the Bill? He did not wish to offer them any suggestions of the kind, but they all knew there were certain things which would be disastrous to the calling rather than otherwise, and if tacked on to the Bill they would find they had got something which was not worth having. He wished to ask seriously whether the trade would be in any way endangered by legislation which might be attached to this Bill, which he believed would benefit both the trade and profession of pharmacy by insisting on a better education, or could they be sure of carrying this through exactly as it was for a purely educational matter?

Mr. HAMPSON said he presumed the Council would have the power of withdrawing the Bill if objectionable provisions were attempted to be introduced into it, and, if not, chemists and druggists would still have the power as a body of bringing the necessary pressure to bear on Parliament, which in all probability would be sufficient to cause the defeat of the altered Bill. Hitherto he had not taken a very active part in supporting a measure which would give power to the Society for increasing the educational status and requirements, but inasmuch as he found out on the last occasion when this matter was before the Council there was an almost unanimous opinion in favour of bringing about this change, he did not intend to-day to be in a minority, but should give this scheme the benefit of his support, and hoped it would be carried through Parliament. It was a definite issue, and though he certainly thought other things might be asked for at the same time, perhaps it was better under the circumstances to wait, the issue being so clear—viz., to improve the educational status and, he hoped, the public confidence in the calling—so that there could scarcely be any doubt that Government would yield to the desire. The Council simply asked for power to be given under a certain condition—the approval of the Privy Council—and he hoped that if the Bill passed the Council would move with considerable caution, and not introduce such changes as would bring forward any opposition, but rather move by steps, so as to bring the new conditions into effect by degrees, and not interfere in any way with the trade or its requirements.

Mr. WILLIAMS said he should like to be able to support this motion if he possibly could, but he felt great difficulty about it. He must say he preferred the first draft to the second, but as a matter of fact he thought it was a very proper thing for the Society to take power if possible to make bye-laws to meet educational necessities. He had no objection to the principle involved, but when he considered what was to follow from this he thought it would be a false step to accept the motion. His feeling was very strongly that an amended Pharmacy Act was required, and if this were a clause in the amended Pharmacy Act he should be prepared to support it; but whether it was wise to pass a resolution to take a Bill into Parliament to carry this into effect was another question altogether, as it might stop the way for future legislation, which was so much required.

Mr. CROSS said it was quite plain on the face of this Bill what the intention of it was. There was a great deal in what Mr. Williams had said, and it was an opinion which he himself had held in common with other members that the new Pharmacy Act should be more inclusive, and that the chemists and druggists' grievances should be attacked as a whole. In this view they were defeated. Under those circumstances he felt that to raise a discussion on that point would now be out of place; but there was also much to be said in favour of attacking difficulties in detail. There was no doubt at present that pharmaceutical chemists and chemists and druggists were not in the position they would like to be, more especially as far as trade defence was concerned. He could not see much in the Pharmacy Act, though it was not worth while to state its deficiencies in public, and it was perhaps as well to say as little about it as possible, looking forward to something better in the future. If their grievances were to be attacked in detail the chief grievance should be taken first, and that was that the qualification of a chemist and druggist was of a questionable nature, and he much regretted to say, from expressions which had been let fall and facts generally known, that belief had been prevalent that the examinations were not so complete as they might be. The chief point at the present time was to make the qualification a matter beyond question. This would be only pursuing the policy their fathers had pursued before them. Pharmacists would have had no claim in 1852, and again in 1868, if they had not educated themselves beforehand; let them complete this matter and then attack the next. They could not sit still long and allow seven people to do what six people dare not do, and if they could get this Bill through there was no reason why they should not again trouble the Legislature. He was not sure that their policy had not been too quiescent, waiting to get all they wanted by a great accumulation of grievances, which might have led to the idea that they wanted so much it was useless to offer them anything. They might go this session and again next session, and by their very persistence they might eventually obtain what was wanted.

Mr. ATKINS did not think there was any ground for encouraging the notion that the examinations were at all defective. What was defective was the education, and when the Council asked for powers to improve the education, it should be distinctly reiterated that it did not wish to increase either the stringency or the cost, but it did wish that education should be distributed over a lifetime, or at least over a portion of a lifetime, believing that matters should not be left as they had been hitherto to the voluntary principle, which was confessedly a failure, there being such a heavy percentage of failure in the examinations, but that the principle of compulsion must be brought to bear. However slowly that conclusion had been arrived at, the Council had been compelled by the logic of circumstances to come to it This Bill was purely

an enabling Bill to acquire power, but of course that meant business. The object was that when this power was obtained the Council should go forward on different lines. He entirely agreed with Mr. Schacht, that while the Council had laboured long and hard at a measure which he thought had been brought to a high state of perfection, still that was not an ultimatum, and he for one should be prepared, when he came to discuss the scheme again, to receive all the side lights which would be brought forward by other contributors. A good deal had been said about education schemes lately, and if this Bill were obtained, something would have to be done. He quite agreed with the President with regard to the power of waiving certain conditions; the Council should be prepared to deal, as he understood, on very elastic lines, to only require the evidence of pupilage for a definite time, but that need not necessarily be under the old-fashioned lines of indentures; all that would be required was evidence of substantial and lengthened training. He need hardly call attention to the last time clause, which could not be a fixed quantity, as it must depend on the fate of the Bill.

Mr. GREENISH said the course the Council was taking in connection with this Bill seemed to him the natural outcome of the rejection of the Bye-laws by the Privy Council. He was distinctly in favour of improved education, but he questioned very much the policy of going to Parliament with this Bill. It seemed to him, from his experience, that when a Bill of this kind went to Parliament it was no longer the property of the Society, but it was public property, so to speak, and any member could try to introduce any clauses or clause he thought fit, which might be very objectionable to pharmacists. He very much doubted whether this Bill had the sympathy of chemists and druggists throughout Great Britain. He believed about one-half were utterly indifferent to a compulsory curriculum, and thought there were not more than one-fourth who were really in favour of it. His difficulty in voting was, as he had stated, that he did not know where the Bill would land them, and was much afraid the Society would come out of Parliament worse than it was before.

Mr. BAILDON said he should support the Bill to a great extent. He felt very strongly indeed that measures were required to insure a more regular and thorough training for those who were to become chemists and druggists. The three years mentioned in the clause was, if anything, an inadequate period for an apprentice to be trained, but it would greatly improve the quality of those who entered the trade if they were compelled to serve a regular course of instruction in the sciences in which they were to be examined. There was no doubt the tendency, not only in their own body, but in other branches of science, had been towards cramming, than which nothing could do more evil to the person who went in for it, or produce worse results upon him in after-life. The idea that the young were to put so much knowledge into the memory in order simply to pass an examination, and take as little trouble as possible about it, was a very low idea altogether, and he was in hopes, by enforcing the curriculum and obliging the students to attend thoroughly qualified teachers and to go through a systematical course, their ideas would be elevated, and they would be led to attain a thorough grasp of the subject rather than to merely pass the examination. On the other hand, he felt the doubt, expressed by others, as to the policy of bringing this Bill into Parliament as a separate Bill. There was no doubt the danger that other things might be introduced by outside influence, and that it might get beyond the control of the Council. There was also the difficulty that if the Council were continually going up with small Bills it might become a nuisance to the Government and fail in that way. However he would not vote against the motion as it stood, because the Council had still to decide whether it should go on at once to introduce the Bill, and he hoped that those who read the report of the debate would bear in mind that, although the Council approved of the principle, and even of the details of the Bill, it had to consider what restrictions should be put on candidates, and especially that there was this power of waiving the three years pupilage when thought necessary. On one little point of detail he would suggest whether it was necessary in line 20 to insert the words, "By certificate of the Committee of the said Council," and whether it would not be sufficient to say "by resolution." He thought it was rather tying the Council down to a certain form of procedure. He did not know with what degree of favour this proposal would be received in the North, but he thought all should consider the question very carefully before raising any clamour against it. No injury would be done that he could see to existing chemists and druggists; they would be put to no additional expense or trouble, and from the trade point of view, it was surely no disadvantage to somewhat limit the number of competitors. He was in some doubt as to the policy of proceeding by separate Bills dealing with each subject by itself, but he was strongly in favour of the principle of a systematic training.

Mr. HILLS said he had followed the discussion with considerable interest, and was heartily glad to hear Mr. Baildon and others speak in terms of approbation of a more perfect scheme of education, which they all thought was necessary for the future good of their own craft. The only point that required to be specified, as far as he could see, was as to the advisability of proceeding with a simple Bill of this kind, and he did not quite gather from Mr. Greenish and Mr. Williams which way they intended to vote. Being both past-Presidents of the Society those gentlemen were naturally looked up to with the greatest respect, and it was a great pity they could not see their way to join in a unanimous vote. This Bill seemed to him much less likely to incur opposition, to have a number of unsatisfactory details added to it, than if it were a larger measure. It was simply a question of education, on which most of the body were united. There might be some who were indifferent, but surely the members of that Council ought to be in the van, and to try and induce them to look at it from this point of view: that something was being done which would ultimately prove to be of great value to the craft generally. He thought himself the simpler the Bill was the less likely it would be to incur opposition, or to have anything objectionable tacked on to it. As to adding a number of other things—trade matters, as they were called—they would be sure to excite opposition, and to have things tacked on; and perhaps the education portion of the scheme would be wrecked with the other.

Mr. GREENISH thought gentlemen should at least give past-Presidents the credit for moral courage when they had to get up and speak on such an occasion, when nineteen out of twenty-one were in favour of a particular scheme, and express their dissent. His feeling was so strong against taking this Bill into Parliament for such a limited matter, that he could not conscientiously vote in favour of it.

Mr. HILLS said he knew that both Mr. Williams and Mr. Greenish had the subject of education very closely at heart, and were really in the van in the movement, and he was very sorry that they happened to be the only ones who could not see their way to support a Bill dealing with that matter simply.

Mr. ATKINS said probably the other members of the Council felt very much with Mr. Greenish and Mr. Williams that this was not all that was wanted; but they were guided purely by tactical considerations, and guided by expediency as to what extent they should go forward. If it were supposed that because they voted for an education scheme, they were indifferent to trade questions, he begged at once to disavow that idea. He believed the conditions of the trade were perilously

critical at the present time. The hearts of men were failing them in regard to their craft. It must not be supposed that the Council was indifferent to those trade conditions. He felt most intensely for the men who were passing through these trying times, and if it were supposed the Council was endeavouring to screw up on the one hand with regard to the qualification, and was indifferent to what might be called the bread-and-cheese question, he was sure he had the Council entirely with him in saying it was not so. The Council was guided purely by the consideration that it might get this Bill through Parliament, when a larger scheme might be wrecked.

Mr. ALLEN said under some circumstances he should have preferred to give a silent vote on this matter, but as the Council had been reminded that it required some moral courage on the part of those opposed to presentation of this Bill to Parliament, he would also remind the Council that it required some moral courage to stand up in face of things, as they were now-a-days, and support it. Mr. Atkins had alluded to the perilous condition of things in the country; he, as a Londoner, and having been a countryman, was well aware of the state of things both in country and in town, and in many cases it was as bad, if not worse, in town than in the country. He supported this Bill for one reason, because he thought it was one way, and decidedly the first way, of putting their house in order, both with the public and with the politicians. Mr. Greenish said a certain section of the community, of pharmacists were very apathetic in regard to it. No doubt a certain section were apathetic with regard to everything. He had heard something of "two or three years' weary talk on the subject of education." He had seen that in print, or had heard it, but as far as he was concerned he would go in for two or three weary years more, because the majority of those round that table believed that that was the best and truest interest of pharmacists. The younger section of the community, as exemplified by the Chemists' Assistants' Association in London, had come to the conclusion that there was something radically wrong with regard to education as leading up to examination, and had adopted to all intents and purposes the scheme which was unfortunately defeated by the Privy Council. Again, there was an association of traders represented by a meeting in the Midlands, which also said the education was radically wrong, and something more was required; and here again were the thoughtful portion of the community of pharmacists, as exemplified by a general meeting of their own members, who adopted the proposed curriculum bye-laws by a very large majority. There was, therefore, every evidence to support the introduction of a Bill of this character, and for that reason he certainly should support it. By one of those coincidences which sometimes occurred, they had that day the Registrar's report presented, from which it appeared that out of 1070 who went in for the Minor examination in England and Scotland, 672 were rejected. He could not conceive, if some scheme were founded based on the power which this Act would give, that such a result would happen. He looked on this Act, or something akin to it, as one of the best things for the rising pharmacists. They would know, and their parents would know what was in front of them, and he could not but believe that any young man who knew thoroughly well what was before him in the way of examination would, so soon as he found himself unfitted for the business, retire from it and take to something else. At present they dragged on for three or four weary years, only to find when they came to London that they were ill adapted for the business, and the consequence was a large number of rejected candidates who eventually filled the position of illegitimate or piratical traders.

Mr. ROBBINS said he should support the Bill, and did not dread the consequences, because he did not think there was anything to dread. The most the Council had to fear would be that it would not be able to carry the Bill through, but with determination he had no doubt success would be obtained. He could scarcely imagine that there would be any opposition to it outside, and he could not see that any chemist would suffer in the smallest degree from its passing. If anyone could complain it would be the coming students, and he contended that it would be a great advantage to them also, as they would have better opportunities of preparing for the examination than the present. He did not see that the Government could tack on anything objectionable; but if it did attempt to do so the Society was strong enough to offer a formidable opposition, and prevent the altered Bill passing. He thought this was one of the greatest steps the Society had taken for a considerable time, and that it would ultimately lead to the great advantage of pharmacists generally.

Mr. SOUTHALL had great pleasure in supporting the motion. No doubt there was a great deal of feeling amongst the trade that things were unsatisfactory as regarded the examinations. He often heard complaints that they were not of much good, but if there was a good curriculum it would be found that it would improve the examinations and trade generally. Of course, the Council, in going for education, had to be rather before the general mass of the trade. It always had been so, and he hoped it always would.

Mr. BOTTLE said this Bill had his entire approbation. He had watched it, and as far as was necessary amended it in committee, and should be pleased to be able to support it by getting some assistance in the House of Commons when it went there. It would be a source of very great satisfaction to him if the Bill went from that Council with a unanimous vote, and so far as he had heard there was no objection to it. The friends who did not see their way to support it did not object on account of anything in it; but they were faint-hearted, and said they could not be sure of carrying it as it was. But they could not be sure of that with any Bill; the moment it was introduced any amendment might be proposed by any member. The duty of the Council was to be vigilant and to see that nothing was introduced which might be objectionable to the trade. On the other hand the trade element might endeavour to add something, and he should not be surprised if such a thing occurred; and if there was no objection to it the Council would certainly not object to any such addition. Still the Council would have to watch narrowly that nothing was introduced which was objectionable, but on the other hand it would hail heartily any additions which might be made to the advantage of the trade. He would ask those who did not think the Bill went to the extent desired to support it as far as he went, being assured that any amendment which might be introduced in the interests of trade and the public at large would have the full consideration and support of the Council.

The VICE-PRESIDENT said the Bill had his entire concurrence, and he thought it would be to the interest of future pharmacists that it should pass. It would also be to the interest of the public.

Mr. HAMPSON said he should like to appeal to those who opposed this Bill, and he might do so all the more heartily as he had for a long time held the same views himself. He really saw no danger in the promotion of this Bill. From the pharmacist's point of view it appeared a desirable thing to accomplish. In future no doubt the Council would have to ask Parliament for something else, and if this Bill came into operation, and better educated pharmacists resulted, it would be in a better position to make those requests to Parliament. No doubt there were some dangers, but these might very well be faced. All steps of this kind were surrounded with a certain amount of difficulty and danger, but so was every important act in life. He would put aside the feeling, and support the Bill on the ground of the advantage it was to the community that those entrusted

with the handling of dangerous medicines and preparations should be an educated body, and that this was a step which would bring about that result.

Mr. SYMES said he should be glad to hear from the President, whether there was any foundation for the fear he had expressed at the commencement of the discussion that undesirable clauses might be added to this Bill.

Mr. WILLIAMS said he had entirely limited himself in his former remarks to the question of the draft Bill, but discussion had gone off in a totally different direction, and the Council had been discussing the propriety of going to Parliament. It was quite clear that if the motion were agreed to the other would follow as a matter of course. He could support the Bill, though on some matters of detail he thought it might be improved; but he certainly looked with dread on going forward to Parliament. He should not, however, vote against the motion.

Mr. GREENISH said, having recorded his strong conviction—without doing which he should not have felt comfortable—that it was impolitic to take the Bill into Parliament at the present time, when there seemed to be everything against them, the Privy Council, members of Parliament, coroners, magistrates, *et hoc genus omne*, still, as he approved of the Bill itself, he should vote for it.

Mr. RICHARDSON said he rejoiced that the two dissenting members were content, as he understood, to join in passing this unanimously. He did not contemplate any exception being taken to it by their constituents, who would, he believed, rejoice to see that the Council was moving, and setting the ball rolling. He hoped this would be the beginning of a very much better state of things in the future for the followers of pharmacy. Any intelligent man must see that this was one of the best things which could be done, not only for the chemists and druggists, but for those who should practise pharmacy in the future.

The PRESIDENT begged to assure Mr. Baildon that the suggestion he had made had been considered by the Committee. It was convenient to use the word "certificate" in clause 2, seeing that the Registrar received certificates for all purposes. The Bill had not been drafted hastily, and he had read almost every Act of Parliament dealing with education in every way. There had been the usual difficulties with the legal adviser in getting into legal language the precise things which the Committee wished, but he thought they had succeeded at last, and he wished Mr. Baildon to understand that the notion was that there should be a kind of standing committee which should deal with educational matters, and send up its certificate, to be afterwards approved by the Council. With regard to the dangers of legislation, it was only fair to remind the Council that by the Rules of Parliament when once a Bill was introduced it became the property of the House. On the other hand there was a general understanding that when a Bill was promoted by a person or corporation there must be some very great public advantage to be gained by interfering with it. Still it was possible that Parliament might think it desirable that the Bill should be taken out of the hands of the promoters, and a series of amendments of a damaging character might be introduced. Then assuming these were carried, there would be only one course to be pursued. The Society would cease to be the promoter of the Bill, and would have to oppose it, and would have to call on its friends throughout the country for support. The frank statement made that day and the general expression of approval of the Bill, would tend to make the members of the Society rally round it and prevent anything of the kind. Mr. Cross, at the first meeting of the Committee, dealt with it as to going to Parliament for one object only, but to day he had made the suggestion that possibly the balance of advantage would be in going piecemeal, and he was not sure that there was not some truth in that. But besides that he believed that the Privy Council Department considered it was the duty of the State to legislate on all poison matters, and of the Pharmaceutical Society to legislate on all educational matters, and in a Bill recently introduced by that department that line had been taken up by the Government. That Bill did not touch education or anything dealing with the Society *quâ* education or examination. To that extent, therefore, the Bill would not be running counter to the underlying current prevalent in the department, and he did not think the Privy Council would be at all desirous of tacking on any of these public or trade questions to a purely educational Bill. There was an enormous disadvantage in having an educational matter mixed up in one Bill with the sale of poisons. The Irish Act was a Pharmacy Act solely, and there was a separate enactment with regard to the sale of poisons, which had led more than once to the suggestion of the Privy Council that in future it would be more convenient to keep these things separate. It might properly be held that they, as a Society, were personally interested in the trade questions, which to some extent warped their judgment, but it could not be said that they did not understand the educational and examinational question. The only difference between them and a Government department would be the extent to which any changes in education could be made, and the rate at which they should be introduced, and so on. All this could be arranged by and bye, if the Council got the powers sought for, and he was satisfied that the trade would be doing itself injustice if it did not as a body support the Council in its endeavours to get this Bill. Some years ago, when he was formerly on the Council, it was a common thing for important resolutions to be carried, after some discussion, unanimously; but of recent years there had been a little difficulty about that, and he thought they had got perhaps a little too conscientious. The Council was to some extent of the nature of a Cabinet, not merely a Parliament. He submitted that it was very difficult for anything to be constructed that twenty-one gentlemen could vote for, without there being some differences of degree, and he could quite sympathize with Mr. Greenish and Mr. Williams as to their doubts about the wisdom of moving in a particular direction; but as they agreed with the Bill itself, and found that their colleagues had thought the matter out, he really asked them to say that on the whole they would vote with the majority.

The motion was put and carried unanimously.

The PRESIDENT then moved that the Law and Parliamentary Committee be instructed to take the necessary steps for the introduction into Parliament of the Bill now agreed to.

Mr. ROBBINS seconded the motion, which was unanimously agreed to.

THE NORTH BRITISH BRANCH.

The PRESIDENT stated that on January 12 last the following gentlemen were elected the Executive of the North British Branch:—Messrs. Ainslie, Boa, Clark, Frazer, Gibson, Gilmour, Hardie, Kermath, Kinninmont, Maben, Mackay, Mackenzie, Nesbit, Noble, Storrar, Strachan and Watt. He had also to report that at a meeting of the Executive, held since, Mr. Baildon had been elected Chairman of the Executive. The members of Council would all unite in congratulating their north country friends on having so excellent an officer, and it would be a distinct advantage for a time that the gentleman who held the office of Chairman of the Executive should be a member of the Council. The position taken by Mr. Baildon for the last two years with reference to the Society's affairs in Scotland had been an active one, and he made no reference to that when he said that he did think, apart from that, that the Executive had adopted a wise suggestion in electing him to be its head. Mr. Watt, of Haddington, had been elected

Vice-Chairman. Consequent upon this appointment, Mr. Stephenson had sent a letter saying he had seen this appointment in the press, and asking when it was desired that the balance in his hands should be transferred, and for instructions upon the subject. The Council had decided that the Chairman of the Executive should have charge of the funds, and he would therefore propose—

"That the thanks of the Council be given to Mr. J. B. Stephenson for his valuable services as Hon. Treasurer to the Society in Scotland during the five years he has held that office. That he be authorized to hand over to the Chairman of the Executive of the North British Branch his account to the end of January, 1887, and any balance in hand at that date.

The VICE-PRESIDENT seconded the motion.

Mr. ATKINS supported the motion from his personal knowledge of Mr. Stephenson, and wished to echo the opinion of the President that the Society had had in Mr. Stephenson a most zealous and painstaking officer.

Mr. BORLAND said he had, as a Scotchman, come into frequent communication with Mr. Stephenson, and he might say of him that no man in Scotland could have discharged the duties imposed upon him in a more faithful and conscientious manner than he had done during the last five years. Although in some matters his views had been somewhat different from those entertained by the Council, he had always shown a most faithful attachment to the Pharmaceutical Society of Great Britain. Whatever he had done had been in its interests, and with a view to further its progress, and to bring it prominently before the community as an institution worthy of support.

Mr. BAILDON said unless one had been on the spot, and seen the zeal and ability which Mr. Stephenson devoted to the affairs of the Society in Scotland, he could hardly appreciate his services. Mr. Stephenson stepped into the breach at the time of the lamented decease of Mr. John Mackay, and the Society could not have found a more able man to fill the position. Only the other day the Assistant-Secretary expressed in the warmest terms his indebtedness to Mr. Stephenson, for although there had been some friction at the outset between Mr. Stephenson's views and those of the Council, that did not detract in the least from the devotion with which he attended to the business of the Society.

The motion was put and carried unanimously.

REPORT OF EXAMINATIONS.

January, 1887.

SCOTLAND.

	Candidates. Examined.	Passed.	Failed.
Major (18th)	2	0	2
„ (25th)	2	1	1
	—4	—1	—3
Minor (18th)	15	6	9
„ (25th)	15	8	7
„ (26th)	14	5	9
	—48	—20	—28

Preliminary Examination.

Candidates. Examined.	Passed.	Failed.
293	151	142

Eleven certificates received in lieu of the Society's Exmination :—

3 College of Preceptors.
1 Faculty of Physicians and Surgeons of Glasgow.
1 Incorporated Law Society.
5 University of Cambridge.
1 „ „ Edinburgh.

The PRESIDENT said a letter had been received from the Hon. Secretary of the North of England Pharmaceutical Society, enclosing a resolution passed at a meetign of that body, to the effect that no system for remedying the defects of the present system of examination and education will be satisfactory unless it provide for compulsory training under some such conditions as those already laid down by the Council.

There was also a letter from the Aberdeen and North of Scotland Society of Chemists and Druggists, enclosing a resolution returning the warmest thanks of the Society for the handsome grant of £50, and adding their sincere appreciation of the courteous words in which the President moved the adoption of the report, and the unanimity with which it was carried by the Council.

There was also a letter from the Sheffield Pharmaceutical and Chemical Society, enclosing the resolutions passed at a recent meeting, which have already been published. The last resolution, referring to the action of the Council, the President proposed should be referred to the General Purposes Committee.

This was agreed to.

A letter was read enclosing copy of a resolution passed at a quarterly meeting of the chemists of Leamington, Warwick and Kenilworth, in reference to the proceedings that were taken against Mrs. Judd.

The PRESIDENT then proposed a vote of thanks to Mr. Thring, of Ceylon, who had been good enough to present to the Society, through Mr. Shand, some very fine specimens of cinchona stems.

This was unanimously agreed to.

THE CONVERSAZIONE.

It was resolved that a conversazione be held on May 18, the President, Vice-President and Treasurer, with Messrs Allen, Butt and Hills being appointed the Committee to carry out the arrangements, and the Secretary being directed to apply to the Director of the South Kensington Museum for permission to hold the conversazione there as usual.

BUILDING COMMITTEE.

This Committee had considered and approved a draft contract with a building firm, prepared by the solicitor and architect, and recommended its execution by the Council.

It was recommended that the works be proceeded with under the direction of the Committee and the Society's architect.

The Council went into committee to consider this report, and had a long discussion upon it, the architect attending.

On resuming, the report of the Committee was received and adopted unanimously.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The annual supper was held on Wednesday, January 26, in the Freemasons' Hall, Surrey Street, when nearly forty members and guests were present.

The chair was occupied by the President, Mr. Newsholme, who was supported by Mr. A. H. Allen, Borough Analyst and President of the Society of Public Analysts; Messrs. Jervis, Preston, Cubley, Ward, Furness, Ellinor, Bradwall, Hon. Sec., etc.

The President gave the usual loyal toasts, and referred facetiously to the Jubilee of Her Majesty's reign, and to modes of commemorating the present year which to pharmacists would commend themselves with special force.

The toast of the evening, that of "Success to the Sheffield Pharmaceutical and Chemical Society," was proposed by Mr. A. H. Allen, who said he was informed the Society included in its roll of members 95 per cent. of

the chemists of the town; he sincerely hoped it would very shortly include 100 per cent. He was aware of the difficulties connected with the carrying on of an association of this description. Unlike the Medical School, which could ask for subscriptions of £5000 and receive the amount, a society of this description had to be largely self-supporting. He felt it a great honour that the toast of the evening had been entrusted to him. Although an honorary member of the Sheffield Pharmaceutical and Chemical Society, still he could not be said to be actually engaged in pharmacy, and perhaps it was on account of his being an outsider in this sense that the toast had been entrusted to him. They must all admit that an association of this kind could not fail to be of incalculable benefit to all concerned. Referring to the Society's work as an educational body, he was gratified to hear of increased laboratory accommodation and premises now thoroughly adapted to the work the Society has set itself to accomplish. He coupled with the toast the name of the ex-President, Mr. Preston.

Mr. Preston, in responding to the toast, said the Council of the Society had the weal of the whole body of chemists at heart, and he thought this would be readily admitted on a perusal of the curriculum and syllabus of the present session of the Society's School, or by any of those who had been fortunate enough to attend the lectures during the session. He had no hesitation in saying that the papers which had been read at their monthly meetings would compare favourably with those delivered in the metropolis or elsewhere.

Mr. Dobb proposed "The Pharmaceutical Society of Great Britain." He could speak, he said, as a chemist of thirty-four years' standing, and referred to the time when he was in opposition to the Society, because it failed to recognize a large and important section of the chemists of that day. But all that was long ago past; the Pharmaceutical Society had done, was doing, and would continue to do good work.

Mr. Ward, F.C.S., Local Secretary, responded. He said it was the tenth time he had at their annual supper replied to the toast. Some fault had from time to time been found with the Pharmaceutical Society, but he believed he was justified in saying that only one-half of the members of the trade whose prerogative it was to vote at the election of the Council exercised the privilege placed in their hands. He assured them the Council of the Pharmaceutical Society was much more active than was generally supposed; he might mention that of legal cases only a small fraction of those in which the Council took action came into public notice.

Mr. Cubley proposed "The Sheffield School of Pharmacy," which was replied to by Mr. Grierson, Lecturer on Botany.

Other toasts followed, which were interspersed with songs, recitations, etc., and an enjoyable evening was spent.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

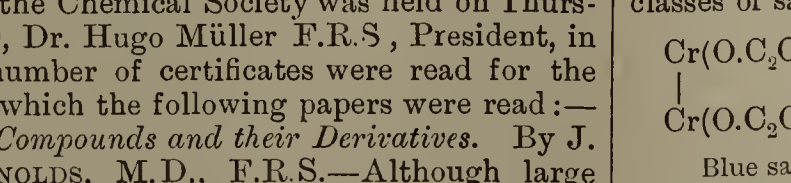
A meeting of the Chemical Society was held on Thursday, January 20, Dr. Hugo Müller F.R.S, President, in the chair. A number of certificates were read for the first time, after which the following papers were read:—

Some Silicon Compounds and their Derivatives. By J. Emerson Reynolds, M.D., F.R.S.—Although large numbers of silicon analogues of carbon compounds are known, it is pointed out that we do not find among the former any well-defined representatives of cyanogen and its deriviatives. The present investigation was commenced some years ago with the primary purpose of obtaining such compounds, if possible, and generally of examining reactions in which the silicon haloids—particularly the tetrabromide—and organic nitrogen compounds take part. In the course of the work a number of new bodies have been obtained, only a few of which can, however, be regarded as cyanogen-derivatives. The author, in this the first paper of a series, describes the action of silicon tetrabromide on thiocarbamide, as the products obtained in this branch of the inquiry were exhibited at the conversazione of the Royal Society last June. It is shown that silicon tetrabromide in benzene solution acts in a very remarkable manner with thiocarbamide, the latter affording a condensed amide with which the tetrabromide unites. Eight molecules of thiocarbamide combine with only one of silicon tetrabromide at the temperature of boiling benzene. Attempts to make this amide unite with a larger proportion of the bromide only lead to decomposition. The product is a thick liquid at a temperature 65° C., below the fusing point of pure thiocarbamide (140° C.), and becomes solid at ordinary temperatures. Solvents of the tetrabromide do not extract any from this product, nor is it dissolved by any liquid without decomposition. When boiled with anhydrous alcohol it affords a monobromo-derivative of pentathiocarbamide, which is obtained from the alcoholic solution in beautiful groups of silky crystals. At the same time bromethyl-thiocarbamide and bromethyl-dithiocarbamide are obtained along with ethylic silicates.

In reply to Mr. Rideal, Professor Reynolds said that in preparing silicon tetrabromide, it was essential to use silica which had been precipitated in the gelatinous form and to mix it most intimately with the carbon (lamp-black); the action of the bromine took place at an extremely high temperature. Replying to the President's question—Had analogous compounds been obtained from urea? he said that urea did react with silicon tetrabromide, but not in the same way as thiocarbamide.

Dr. Armstrong remarked that, assuming the bromine to be the linking agent, it was noteworthy that in the silicon compound and also in that of ethyl bromide with thiocarbamide the ratio was Br: $2CSN_2H_4$: this perhaps might be regarded as an indication that the thiocarbamide molecule had at least the formula $C_2S_2N_4H_8$; the ratio in the remarkable compound with bromine was, however, different.

Chromo-organic Acids. Part I. Certain Chromoxalates. By Emil A. Werner.—This paper contains an account of the salts resulting from the combination of chromium oxalate with certain metallic oxalates. A study of these compounds has led to the conclusion that they cannot be considered as ordinary double salts, but are in point of fact salts of complex chromoxalic acids. A similar view of the constitution or these compounds was advanced by Malaguti in 1843, but strange to say has been entirely ignored, since all workers with these particular compounds (with the exception of Clarke and Kebler) have treated them as double or triple salts. Malaguti's view has been considerably extended, and new experimental evidence furnished in support of it; it has also been shown that the oxalic radicle can be displaced by those of other organic acids, salts of which have been obtained. The paper concludes with the description of a new series of chromoxalates, whose members are shown to be closely related to those already known. The following are examples of the formulæ given by the author to the three classes of salts:—



Blue salt. Red salt. Green salt.

Dr. Japp thought that some of the provisional constitutional formulæ proposed by the author for the various series of chromoxalates were open to criticism. In the formula for the salt of the "red series," for example, two oxygen-atoms, united to oxalic acid radicles, were represented as satisfying each other's affinities—an arrangement which would place these stable salts in the same category as the explosive peroxides of acetyl and benzoyl; whilst at the same time the two chromium-atoms in the

formula were doubly linked. It was only necessary, however, to suppose that these vacant affinities of the chromium-atoms were satisfied by those of the oxygen-atoms in order to represent the salts as perfectly normal, thus :—

$$KO.C_2O_2.O.Cr<^{O}_{O}>C_2O_2$$
$$\quad\quad\quad

occurrence of any other salts of mercury than oxide, and also gets rid of such impurities as lead and tin, should they be present, by precipitating them as hydrates and redissolving them.

The mercurous oxide was estimated by treating a weighed amount of the sample with dilute hydrochloric acid until all the yellow colour disappeared, and nothing remained undissolved but the small quantity of mercurous chloride. This was filtered off, washed with hot water, dried at 100° C., and weighed. From this weight was calculated the percentage of mercurous oxide. The mercuric oxide was estimated by passing sulphuretted hydrogen through the filtrates obtained in the previous estimation, after nearly neutralizing them with alkali. The resulting sulphide was then separated, dried and weighed, from which weight was obtained the equivalent weight of mercuric oxide.

The following are the results of 100 parts of each sample :—

	HgO.	Hg_2O.	Fixed matter.
1.....	98·238	·454	·272
2..... ..	96·489	·895	1·007
3.....	98·174	·532	·371
4.....	98·237	·746	·416
5.....	97·692	·268	·212
6.....	96·895	·853	·954
7.....	97·787	·758	1·015

The deficits, I presume, may be attributed to moisture which was not separately estimated, except in one or two cases, as a check.

It will be seen that all these samples are very satisfactory, especially when we consider the amount of time and trouble required to wash away the last traces of a bye-product from a large quantity of a preparation.

The mercurous oxide may be due to the mercuric chloride containing some soluble mercurous salt, which is scarcely probable, or else it may form in the mercuric oxide on keeping. A freshly made sample, prepared by myself, gave a perfectly clear solution with dilute hydrochloric acid.

A discussion followed, in which the Chairman, Secretary, Messrs. Southall, Farr, and White joined. There being no miscellaneous business brought forward, the meeting then adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at 103, Great Russell Street, on January 26, Mr. H. H. Millhouse (President) in the chair.

Mr. Bird having read the minutes of the previous meeting, they were confirmed.

The Chairman then called on Mr. MacEwan to read a paper on "The Pharmacognosy and Chemistry of Calabar Beans," of which the following is an abstract.

The Pharmacognosy and Chemistry of Calabar Beans.

BY PETER MACEWAN, F.C.S.,
Pharmaceutical Chemist.

Two years ago the author examined a number of samples of the extract of Calabar bean of commerce, and the results were communicated to an evening meeting of the North British Branch of the Pharmaceutical Society.* At the same time Mr. Adam Gibson communicated a paper on the preparation of the extract, in which he showed that a menstruum containing 66 per cent. of alcohol was better adapted for the exhaustion of the drug than the rectified spirit prescribed by the Pharmacopœia, the yield of extract being about four times more, while it contained only half as much alkaloid. The author's results from the examination of commercial extracts showed that they varied in alkaloidal strength from 1·1 per cent. to 10·5 per cent. (nearly); and while part of this variation was apparently due to the use of menstrua of different alcoholic strength, there were two samples, containing 6·6 per cent. and 10·47 per cent. of alkaloid, which appeared to have been prepared from a drug of unusual potency, and it was suggested that probably the bean obtained from *Physostigma cylindrospermum* had been used in their preparation. The inquiries since made regarding this point form the basis of this communication.

The official Calabar bean was first brought to England in 1840, by Dr. W. F. Daniel, but it was nearly twenty years later before the late Dr. Balfour, Professor of Botany at the Edinburgh University, and Regius keeper of the Botanic Garden of that city, received a specimen of it for identification, and he gave it the generic name *Physostigma*—literally inflated stigma, in reference to the hooded appendage of that portion of the flower; and the specific name *venenosum*, owing to its toxic properties. Previous to this (in 1855) the late Professor Christison had tried the physiological effect of the drug upon himself. Daniel Hanbury was the first English pharmacist who took notice of the new drug, his papers to the *Pharmaceutical Journal* about 1864 referring chiefly to the best methods for exhibiting it medicinally. At the same time Dr. T. R. Fraser began that series of elaborate experiments, pharmacological and physiological, which demonstrated the action of physostigma. It will be found on examining a moderate quantity of beans that the shapes are not altogether alike, and that some beans are violet black, while others are of a coffee-brown colour. The former are fully-ripe seeds, and the latter are probably immature. This difference has been suggested as an indication of probable difference in strength; moreover, the fact that the native priests of Calabar know how to select non-potent seeds for use as ordeal beans by any of their favourites, indicates that some variation in the alkaloidal strength of the bean may be looked for. In 1879, another kind of bean appeared in the London drug market for the first time, mixed with the ordinary Calabar beans. Mr. Holmes found a similar bean in the British Museum labelled *Mucuna cylindrosperma*, but, the evidence being against the seed having been obtained from a Mucuna, he named it *Physostigma cylindrospermum*. The seeds are longer and more cylindrical than the ordinary bean, but the most distinctive point of difference between the two is that the hilum of the long bean does not extend to the extremity where the micropyle is visible, but stops short about a quarter of an inch therefrom. But the author has failed to find that this bean has ever occurred in the market since 1879. Unless, therefore, the samples of strong extract examined by him had been some time in stock, or had been prepared from beans that had been a long time in stock, the surmise that they were prepared from the long bean is probably erroneous.

The chemical constituents of Calabar bean other than those peculiar to leguminous seeds generally are its alkaloids, physostigmine and calabarine; also phytosterin, a body related in composition to cholesterin. The activity of the bean is attributable to physostigmine. Calabarine is reported to have a physiological action resembling that of strychnine.

The purpose of the experiments commenced by the author was to ascertain the proportion in which the various constituents exist in the brown and black varieties of the official drug, and also in the cylindrical bean, and to determine their properties, chemical and physical. As he is not now in the position to complete the work he suggested that some member of the Association might take it up.

Mr. MacEwan said that in preparing the bean for analysis comminution is best effected by a mill, as the mortar and pestle cause considerable loss of the tough testa. The proportion of moisture in the brown and

* *Pharm. Journ.*, [3], xv., 594.

black beans is the same, viz., 7·2 per cent., but a slight difference in the percentage of ash was observable, the black yielding 3·1 per cent. and the brown 3·4 per cent. He thought a complete analysis of the constituents of the ash might throw some light on the condition in which the alkaloid exists in the bean.

In the analysis with solvents 50 grams of bean were used in fine powder, and maceration in each solvent was continued for not less than fourteen days. Petroleum ether and ethylic ether (anhydrous) were so used. In each case 50 c.c. of the respective liquors were evaporated on a water-bath to determine the amount of matter dissolved, and this checked with the amount obtained from the rest. The black bean yielded to petroleum ether 1·068 per cent. of a thick golden yellow oil, which contained tufts of white crystals, but did not possess any distinctive odour. The brown bean showed a decided difference, only 0·2 per cent. of the same being obtained. Examination of this residue proved that the crystalline body was phytosterin. This substance was first isolated by Dr. O. Hesse, and a description of it was given by him in *Annalen der Chemie* (cxii., 175). It is insoluble in water, even if alkaline; is more soluble in glacial acetic acid than in other strong acids, and is little affected by cold alcohol. The body melts at 132° to 133° C. to a colourless fluid, which forms radiate crystals on cooling. At a higher temperature it partially volatilizes, but again crystallizes when cooled. The formula of phytosterin was determined by Hesse to be $C_{26}H_{44}O$, and, though resembling cholesterin, the two bodies are by no means the same.

Ethylic ether extracted from the bean (after petroleum ether) 0·36 per cent. of a yellow oil of an agreeable odour, which separated a white granular body. The oil was soluble in alcohol, the solid in ether. The latter did not appear to be phytosterin, for it failed to crystallize.

In assaying extract of physostigma, the author obtained excellent results by a gravimetric method, which consisted in treating the extract with water acidulated with acetic acid, removing extractive and colouring matter with lead subacetate, subsequently removing excess of lead, adding ammonium carbonate to alkalinity, and dissolving out the alkaloid with chloroform. According to Harnack and Witkowski the bean contains two alkaloids—physostigmine and calabarine—which are physiologically antagonistic to each other. They attributed the variation in the potency of commercial samples of alkaloid to the presence of calabarine in greater or less quantity. Physostigmine is soluble in chloroform and ether, and its iodohydrargyrate is soluble in absolute alcohol. Calabarine has been described as being soluble in chloroform, but not in ether, and its iodohydrargyrate as insoluble in alcohol.

For several reasons the author is inclined to doubt the existence of calabarine. The alkaloidal residue, obtained by the method described, ought to contain it. But this residue is wholly soluble in acidulated water, and the iodohydrargyrate thrown down from it is quite soluble in alcohol. The residue itself when treated with ether was found to be soluble.

The variation which exists in the commercial alkaloid the author is inclined to attribute rather to faulty methods of preparation, among which he includes the official method. In order to avoid in assaying the contamination due to the formation of rubeserine by oxidation he tried the method of precipitation by Mayer's solution, following the directions of Massing, of Dorpat, but failed to get the Mayer's solution to work satisfactorily. Subsequent experiments led him to conclude that the volumetric process was far from reliable, and that the gravimetric, with ordinary precautions, gave more satisfaction, the alkaloidal residue being available for testing for calabarine. He recommends the following:—Digest the powdered bean with it own weight of a mixture of 3 parts of rectified spirit and 1 part of water for a day, then pack in a percolator, and percolate with the same alcoholic menstruum until the percolate on dilution with water gives only a slight opacity with Mayer's solution. Evaporate the spirit, and treat the residue with lead acetate, etc., as previously described. The alkaloidal residue obtained should be of a pale amber colour, and wholly soluble in a dilute acid.

The Chairman, in opening the discussion, made some remarks on the practical nature of the paper, which he thought would be found of much interest to pharmacists.

Mr. J. E. Saul said that he had had to manipulate eserine on the large scale, and, like other pharmacists, had been annoyed at the proneness to change of its salts in solution. It had very recently been stated in one of the London journals of pharmacy that the red coloration was due to absorption of ammonia, and that the addition of some weak acid, such as boric, would effectually prevent the change. He (the speaker) did not consider that the work of either Petit or Duquesnel pointed to ammonia absorption as the cause of change, and his own experiments quite confirmed the opinion that oxygen was the factor in the reaction. The addition of ammonia or any other alkali merely liberated the easily decomposable alkaloid, and it would be found on shaking the tube in order to allow the liquid to absorb oxygen that the colour rapidly deepened. Moreover he had found in practice that neither a weak acid like boric nor a strong one such as hydrochloric prevented this peculiar degradation of the alkaloid; the change from the point of view of the pharmacist being best described as degradation, as rubeserine had been proved to possess neither toxic nor mydriatic properties. If an already coloured solution were heated with dilute hydrochloric acid the red tint is not in the least degree affected. On heating a coloured solution with such a reducing agent as HPH_2O_2, however, the colour is completely discharged, and the same result immediately follows in the cold if sulphurous acid be employed. To practically apply these remarks he would suggest to those who wished to prepare a stable solution of eserine sulphate that they should first deprive their distilled water of dissolved gases by boiling until the liquid "bumps," rapidly chilling, adding the quickly-weighed salt, then a drop or two per ounce of sulphurous acid, and finally preserving in a full closely-stoppered bottle, for SO_2 is of course both volatile and easily oxidized. A solution thus prepared has been tried and found to exercise no irritating effect on the eye. The oxidation reaction of Petit had often been referred to as a valuable test for the alkaloid; but the process of evaporating a solution down with excess of ammonia was in an ordinary pharmacy both unpleasant and tedious. He (Mr. Saul) had found that by heating a solution of a salt of the alkaloid to the boiling point and then adding a few drops of 70 per cent HNO_3, an orange-coloured liquid was produced, which on supersaturation with NaHO yielded an intensely vivid violet solution, becoming wine-red on dilution with water. This violet colour he noticed was exceedingly sensitive to acids and alkalies, assuming a pale orange tint on the addition of the former, and again resuming the purple hue when the acid reaction had been destroyed. After criticizing the method of extraction on which Mr. MacEwan had founded his opinion of the non-existence of calabarine, suggesting the use in medicine of a less deliquescent salt of eserine than the sulphate, such as the hydrobromide, and referring to the state of combination in which the alkaloids exist in the seed, Mr. Saul concluded by proposing a cordial vote of thanks to the author for his excellent paper.

Mr. T. A. Ellwood stated that he had used the extract of Calabar bean rather largely. A medical man of his acquaintance always used to prescribe an extract made from the nucleus of the seed, the testa being removed, and, according to him, the extract thus made was more uniform and reliable in its effects than one made from the entire seed, which, whilst it produced the same

effects, was more variable; he considered, therefore, that an extract of the nucleus was the best pharmaceutical preparation. The speaker would also like to point out that phytosterin and cholesterin belonged to the same class of compounds, the former being a methyl compound of the latter. In preparing the extract of the bean he had used rectified spirit with water and acetic or hydrochloric acid added, and found that acetic acid afforded best results.

Mr. MacEwan then replied with regard to Mr. Saul's remarks. It is usually assumed that the change from physostigmine to rubeserine is due to ammonia, addition of alkali to a solution of the alkaloid imparted an intense violet colour to it. This being destroyed by SO_2 showed that it was due to oxidation. Mr. Saul's suggestion that sulphurous acid should be employed to preserve the solution was a very valuable and practical one. With respect to the ash showing the state of combination of the alkaloid in the bean, he would expect to find it combined with H_2SO_4 or H_3PO_4, and in the near future he thought it would probably be found that alkaloids generally were combined with these acids, and not with organic ones. With regard to Mr. Ellwood's remarks, it was generally stated that the testa was inert, but that gentleman's experience seemed to prove the contrary. The variation in strength of the commercial extract was probably due more to the different menstrua employed than to differences in the proportion of testa. Mr. Saul did not think that the process used in the experiments with Mr. Gibson was quite satisfactory, he could only state that it gave constant results, and there was no evidence of any decomposition; a process which gave constant results must be most accurate. The great difficulty in using Mayer's solution was that the precipitate could be dissolved. On the whole he found the volumetric processes for the estimation of alkaloids were far from satisfactory, whilst, on the other hand, if you got something definite and evaporate, of which you could prove the purity and actually weigh, you could feel satisfied with your results.

The Chairman: Mr. Ellwood says the testa is inert; if that be so the variation might be due to more testa in some seeds than in others.

Mr. Ellwood corrected, saying that he only mentioned it as being variable in therapeutical effects, he had no information as to actual strength.

Mr. MacEwan: The testa is generally considered to be inert. Mr. Ellwood has therefore made a discovery, and this, together with the proportion of testa in different seeds are two good points for investigation.

The Chairman then stated that thinking the paper was rather a short one, Mr. E. H. Farr had kindly consented to fill up the rest of the time by a note on some of the adulterations of cubebs.

Mr. Farr then exhibited and described most of the adulterations which have recently been found in cubebs as offered at the drug sales, and of which mention has been made in the trade journals from time to time, and supplemented his remarks by handing round a card on which sections were mounted, showing in a practical manner the structural differences, as seen by the naked eye or with an ordinary pocket lens.

The proceedings then terminated.

BOOKS RECEIVED.

A Manual of Botany, including the Structure, Classification, Properties, Uses, and Functions of Plants. By Robert Bentley, F.L.S., M.R.C.S., etc. Fifth Edition. London: J. and A. Churchill. From the Publishers.

What to do in Cases of Poisoning. By William Murrell, M.D., etc. Fifth Edition. London: H. K. Lewis. From the Publisher.

Year-Book of Pharmacy, with the Transactions of the British Pharmaceutical Conference, 1886. London: J. and A. Churchill. From the Secretaries.

Obituary.

Notice has been received of the death of the following:—

On the 16th of December, 1886, Mr. William Brightin Silvers, Chemist and Druggist, Camberwell. Aged 28 years. Mr. Silvers was an Associate in Business of the Pharmaceutical Society.

On the 8th of January, 1887, after a lingering illness, Mr. Michael Jones, Chemist and Druggist, Chester Street, Flint. Aged 69 years. Mr. Jones had been a Member of the Pharmaceutical Society since 1869, and Local Secretary for Flintshire from the time Local Secretaries were first appointed.

On the 15th of January, Mr. Joseph Brough, Chemist and Druggist, High Street, Longton. Aged 66 years.

On the 19th of January, Mr. Edward Selleck, Pharmaceutical Chemist, Highgate Road, N.W. Aged 69 years. Mr. Selleck had been a Member of the Pharmaceutical Society since 1868.

On the 20th of January, Mr. John Firth, Chemist and Druggist, Albert Road, Queensbury. Aged 63 years.

On the 23rd of January, Mr. Charles Albert George, Chemist and Druggist, Brookhill, Sheffield. Aged 44 years. Mr. George had been a Member of the Pharmaceutical Society since 1878.

On the 25th of January, Mr. Edward Orlando Cleaver, Chemist and Druggist, High Street, Croydon. Aged 41 years. Mr. Cleaver was an Associate in Business of the Pharmaceutical Society.

Referring to the late Mr. J. M. Hucklebridge, of Upper Ebury Street, whose death was recorded on the 1st ult., a correspondent writes:—"It is much to be regretted that the late Mr. Hucklebridge did not more publicly interest himself in pharmaceutical matters, as he would have been an authority upon the art of percolation, he having brought that operation to perfection upon nearly every tincture in the B.P. Tincture of opium in particular he was most successful with in treating by displacement, the marc having subsequently been submitted to Dr. J. E. D. Rogers, late Professor of Toxicology at the London Hospital, who reported most favourably upon its complete exhaustion. The percolators used were made by the York Glass Company, from Mr. Hucklebridge's own design. Another point upon which much light could have been thrown was the manipulation necessary for the preservation of leeches; the animal and vegetable life in his aquarium so nicely balanced each other, that the water was not changed for years, yet the loss of one single leech was a rarity. There is also to be seen at 116, Ebury Street, a salt water receptacle filled with artificial sea water, made from an analysis of the same. This has also been in existence for years unchanged, and it is teeming with marine life in a most perfect state of preservation."

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Trade Association.

Sir,—I feel convinced that not a few chemists will be deeply grieved by the necessity which calls forth the appeal which has been issued by Mr. Haydon on behalf of the Trade Association.

One can hardly imagine that a trade composed for the most part of men of intellect, judgment and reason, engaged in a business bristling with legislative surroundings, should be so utterly blind to their own interests, and to their need of a special protective agency such as this Association provides, and yet stand aloof from joining its

membership. What is it but practically saying, "Every man is fallible but myself; there is no possibility of my ever being pounced upon by any of Her Majesty's zealous officers for any irregularity, accidental or otherwise; there is no probability of my ever retailing, or dispensing, or prescribing over my counter any drug, patent medicine, or bottle of medicine, the legality or illegality of which could be called in question; no Act of Parliament or Excise regulation exists, or is likely to be propounded, which can in any way affect my interests; no knotty legal question of a technical character upon which a legal opinion might save me much annoyance can possibly occur; not one of these contingencies is ever likely to happen to me? Why then should I subscribe to the Trade Association?"

Again, others say, "It is perfectly true that the Trade Association has done great good in various cases; unjust actions have been brought against several chemists charging them with infringement of certain Acts of Parliament, and this Association has at its own cost defended and protected those chemists, thus saving them untold expense and anxiety. But I shall never need its help, why then should I subscribe to its funds?"

Such are the short-sighted—may I not add intensely selfish?—arguments by which hundreds of educated chemists excuse themselves from supporting this Association. I have myself, when Local Secretary in this town, repeatedly been met with such arguments, and now to-day we see the result of this apathetic indifference in the threatened collapse of the Association.

Is this to be the case? We often hear it given as an argument against supporting the Pharmaceutical Society, that it takes no part in matters of direct trade interests (upon that question I express no opinion); but here is an Association having for its one specific object the direct protection of trade interests, which has repeatedly proved its ability to fulfil that object, and yet the trade at large is ignoring its existence and by withholding its support is doing its best to deprive itself of the benefit of an Association, the need of which may at any moment be experienced by any one of us.

It is greatly to be hoped that the direct effect of the circular issued by Mr. Haydon may be a real awakening in the trade to the importance of at once coming to the rescue, and by a large influx of new subscribers averting the threatened catastrophe, and securing the permanent safety of an Association, the loss of which will otherwise be undoubtedly realized when too late.

154, *Marine Parade, Brighton.* EDWIN B. VIZER.

[*** We have received also some other letters to the same effect.—ED. P. J.]

THE SUPPLY OF POISONS BY OILMEN AND DRUG STORES.

Sir,—I read with interest the letter of your correspondent in the Journal, January 22. I think this question is more important than that of "What is Laudanum?" We have in our town another shop of the drug store type just opened, fitted up exactly as a chemist's shop; in fact, to the eye, it presents the exact appearance of a chemist's shop, only with this difference, there appear the words "Drug Store" after the name. You can obtain paregoric at some of these shops, if not all of them, of course "sine opii," which is a "fraud" to the customer, and I have no doubt poisons are sold where it is safe. Now these ought not to exist. I, with the rest of the trade in the provinces, feel that some action should be taken in this matter, especially as the Trade Defence Association, which has done good work, is about to collapse. We are almost daily as a trade censured by Coroners for our selling poisons, in the face of our being legally qualified to do so, at the same time, oilmen, drug stores, etc., etc., *ad nauseam*, are poaching on our preserves, the situation becoming every day more and more critical. I think if this matter was taken up, either by the trade or the Pharmaceutical Society, it might result in good. I think if your readers could see eight chemists' shops within about five hundred yards, and two stores, and could feel the effects of such, they would rise as one man, and leave the "dry as dust" discussions to face stern realities, which have our claim to attention, as I feel most certainly that instead of ours being a "profession," it will soon be a defunct "trade," except to a few who are able to be in it for amusement and not profit.

Hull. REFORMER.

WHAT IS LAUDANUM?

Sir,—With all respect to Mr. Bell I venture to express the opinion that his quotation from Skeat's 'Etymological Dictionary' does not weaken the testimony of the authorities cited by me.

Dr. Mahn tells us the name laudanum was not invented by Paracelsus, and this statement can be accepted without any prejudice to the derivation given in Hooper's 'Lexicon,' because the question is not who invented it, but what was it derived from. He also states that it existed in Provençal before the time of Paracelsus (*i.e.*, 1493–1541). That being so, what is there absurd in the idea of the Provençal word laudanum being derived from the Latin *laus*, *laudare* or *laudandum*? For, did not the Provençal originate from Latin? As regards the assertion of the name having been transferred from one drug to another, it is only Mr. Skeat who says so, not Dr. Mahn or Webster.

It may seem somewhat bold to express one's opinion in the terms I used, but I must retort. It seems to me still more hazardous to accept without explanation the statements and suggestions contained in that quotation; because it should not be overlooked that the works quoted by me had passed through several editions, their authors were tried men, thoroughly well acquainted with the literature of their respective branches of science, and well known throughout Europe as painstaking writers on materia medica, pharmacy and philology.

As to Mr. Bell's objection that being so ancient they cannot be so trustworthy as the latest philologers, I fail to see the force of it. The earliest I cited was Mathiolus of 1563, whereas Skeat begins by refering to Kersey, of 1715, then to Blount, of 1674, next to Ben Jonson, about 1600, and finally to Pliny, whose Natural History was written more than 1800 years ago, and with which it is clear almost every one of the authorities mentioned by me was known to be acquainted.

It is an error to suppose I entertain any other feeling than that of respect for the name of Dr. Peter Andrew Mathiolus, of Sienna.

With regard to the word "opiate," that certainly is an instance of a name being transferred from one class of preparation to another, as originally it signified only such confections or electuaries as contained opium, but afterwards came to be used for compounds containing no opium whatever, merely the consistency and appearance of the former. In this sense it is still used in French pharmacy.

Middle Road, Roxeth. J. EAGLE.

A. E. Lomax.—CXXXIV., Polygonaceæ. 6. *Pelargonium*, Lher.

Minor asks for information respecting the composition of "Holmes's Paste for Erysipelas."

Diligent Reader.—We are unable to suggest what gas might be indicated under the name.

T. F. Walker.—Apply at the Trade Marks Registry Office, 25, Southampton Buildings, London, W.C. An abstract of the Act of Parliament and rules relating to the registration of trade marks will be found in the Calendar of the Pharmaceutical Society. This registration is not the same as "entering at Stationers' Hall."

R. H. Shields.—So far as we are able to judge, all the articles referred to in the labels, as well as those marked on the "list of Spécialités" sent, would be liable to stamp duty under the definitions in the memorandum recently approved by the Board of Inland Revenue (see before, p. 598).

W. Asten.—Linimentum Terebinthinæ.—Until some authoritative statement has been made respecting the characters of this preparation, we think it undesirable to continue the publication of correspondence on this subject.

"*Subscriber.*"—The amount of lime contained in the water is considerable; but not enough to make it unsuitable for the preparation of ordinary aërated water.

Phenol.—The coloration is probably due to an alteration of the carbolic acid to which the nitrous ether may contribute.

COMMUNICATIONS, LETTERS, etc., have been received from Dr. Saunders, Messrs. Shields, Burton, Truman, Pellew, Jones, Barrett, Grierson, Whitla.

Eff. Cin Chouc Liq. (DeVry)	*A true liquefied Cinchona*
Eff. Cin Chouc Liq. (DeVry)	*Bark; the first preparation*
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Eff. Cin Chouc Liq. (DeVry)	*The organic constituents of*
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Eff. Cin Chouc Liq. (DeVry)	*peculiar properties preserved*
Eff. Cin Chouc Liq. (DeVry)	*intact. The Extract forms,*
Eff. Cin Chouc Liq. (DeVry)	*when diluted with distilled*
Eff. Cin Chouc Liq. (DeVry)	*water, a permanently clear*
Eff. Cin Chouc Liq. (DeVry)	*solution, not to be distin-*
Eff. Cin Chouc Liq. (DeVry)	*guished from fresh infusion*
Eff. Cin Chouc Liq. (DeVry)	*of Bark. Being of definite*
Eff. Cin Chouc Liq. (DeVry)	*strength, the dose of the Ex-*
Eff. Cin Chouc Liq. (DeVry)	*tract may be determined with*
Eff. Cin Chouc Liq. (DeVry)	*scientific accuracy, and by its*
Eff. Cin Chouc Liq. (DeVry)	*use Cinchona Bark may be*
Eff. Cin Chouc Liq. (DeVry)	*administered with a pre-*
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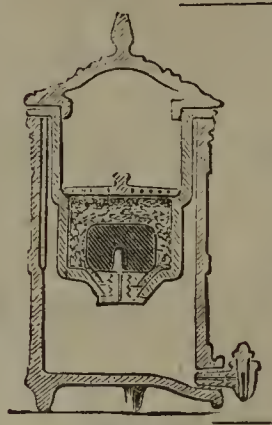

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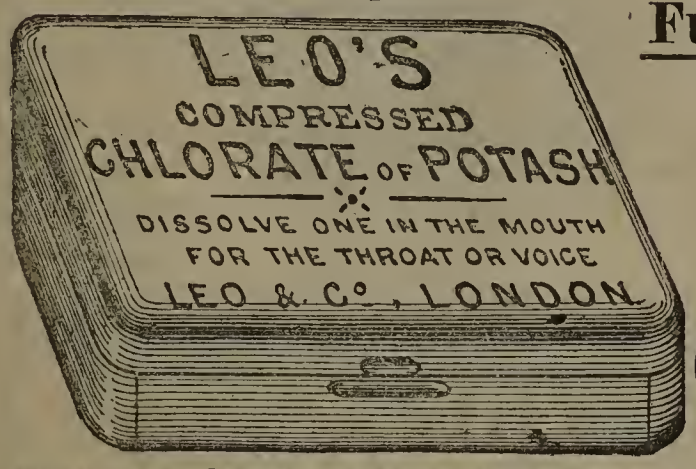

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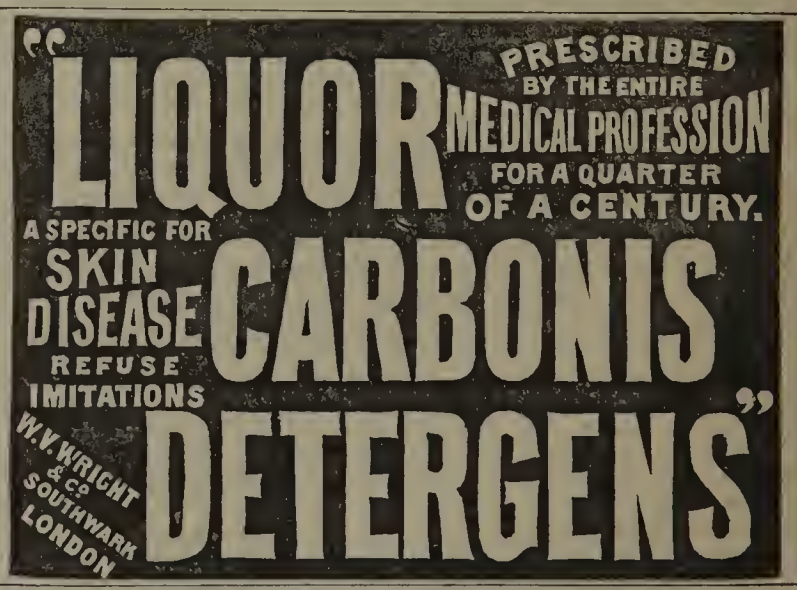

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No tender will be received unless it is made upon one of the printed forms issued from these Offices.

The Board do not pledge themselves to accept the lowest or any tender.

By order of the Board of Works for the Wandsworth District.

HENRY GEORGE HILLS,
Clerk to the Board.

Battersea Rise, S.W.
2nd February, 1887.

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The Pharmaceutical Journal AND Transactions.

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Year.	No. of Members.	Dividend.
September 30th, 1878	119	None
,, 1879	350	None
,, 1880	430	None
,, 1881	540	None
,, 1882	615	3¾
,, 1883	708	5
,, 1884	908	6
,, 1885	1,193	6
,, 1886	1,463	6

The results of the Working for this period were as follows : 1879 being the first complete working year :—

		£	s.	d.
1879	Loss	260	13	8
1880	Profit	275	0	1
1881	,,	729	5	3
1882	,,	904	18	0
1883	,,	1,307	2	10
1884	,,	1,919	0	4
1885	,,	1,844	10	7
1886	,,	2,170	14	0

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,, Dilute (Hall's Dinner)		5 0	16 0
,, Socotrine, B.P.	5 gr.	5 0	16 0
,, and Asafœtida, B.P.	5 gr.	5 0	16 0
,, and Iron, B.P.	5 gr.	5 0	16 0
,, and Myrrh, B.P.	3 gr.	5 6	18 0
,, ,, ,,	5 gr.	6 0	20 0
,, Nux Vomica		6 0	20 0
Aloin	1-10 gr.	5 0	16 0
,,	1-4 gr.	6 0	20 0
,,	1-2 gr.	7 0	24 0
,,	1 gr.	11 0	39 6
,, Compound		7 0	24 0
,, and Strychnine		7 0	24 0
,, Strychnine and Belladonna		7 0	24 0
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Anti-Dyspepsia (Fothergill's		7 0	24 0
Aphrodisiac		16 0	59 6
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,, ,,	1-20 gr.	5 0	16 0
Asafœtida, U.S.		5 0	16 0
,, Compound, B.P.	5 gr.	5 0	16 0
Atropine	1-300 gr.	7 0	24 0
,,	1-100 gr.	7 0	24 0
Blue Mass, B.P.	1 gr.	5 0	16 0
,, ,,	2 gr.	5 0	16 0
,, ,,	3 gr.	5 0	16 0
,, ,,	5 gr.	5 6	18 0
,, ,, Colocynth and Hyoscy		9 0	32 0
Calcium Sulphide	1-10 gr.	6 0	20 0
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,, ,,	1-2 gr.	6 0	20 0
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,, and Opium		7 6	26 0
Camphor and Hyoscyamus		5 6	18 0
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Cascara Sagrada Extract	3 gr.	7 0	24 0
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Codeine	1-2 gr.	20 6	79 0
Colocynth Comp. B.P.	4 gr.	8 0	28 0
,, ,, ,,	5 gr	9 0	32 0
,, ,, and Blue Mass	5 gr.	9 0	32 0
,, ,, and Calomel	5 gr.	9 0	32 0
,, ,, and Hyoscy, B.P.	5 gr.	9 0	32 0
,, ,, Extract, B.P.	5 gr.	9 0	32 0
Conium Compound, B.P.	5 gr.	5 0	16 0
Copaiba Compound		5 6	18 0
,, and Oloe-Resin Cubeb	5 gr.	11 0	39 6
Corrosive Sublimate	1-30 gr.	5 0	16 0
,, ,,	1-20 gr.	5 0	16 0
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Digitalin	1-60 gr.	7 0	24 0
Elaterine	1-20 gr.	13 0	47 6
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Ergotin	3 gr.	16 6	63 0
Euonymin	2 gr.	16 0	59 0
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,, Compound		16 0	59 0
Ferruginous (Blaud's)	3 gr.	6 0	20 0
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,, and Iron		5 0	16 6
Ipecac. Powdered	1-4 gr.	5 0	16 0
,, ,,	5 gr.	9 0	32 0
,, Comp. (Ipecac. and Opium)	5 gr.	5 0	16 0
,, and Squill, B.P.	5 gr.	5 6	18 0
Iron Arseniate	1-8 gr.	5 6	18 0
,, Carbonate, B.P.	5 gr.	5 0	16 0
,, by Hydrogen (Quevenne's)	1 gr.	7 0	24 0
,, Iodide (Blancard's Formula)	1 gr.	10 0	35 6
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,, Quinine, and Strychnine		5 6	18 0
Laxative Vegetable (Improved Cath.)		9 0	32 0
Manganese, Bin-oxide	2-gr.	5 0	16 0
Mercury, Bin-Iodide	1-16 gr.	5 0	16 0
,, Proto-Iodide	1-8 gr.	5 0	16 0
,, ,,	1-4 gr.	7 0	24 0
Morphine, Muriate	1-8 gr.	9 0	32 0
,, ,,	1-4 gr.	15 0	55 6
Narcotic Extracts (Brown-Sequard)		7 0	24 0
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,,	1-50 gr.	7 0	24 0
Opium, Powdered	1 gr.	7 0	24 0
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,, and Camphor		7 0	24 0
Pepsin, Pure Concentrated	1 gr.	9 0	32 0
Phosphorus	1-000 gr.	6 0	20 0
,,	1-50 gr.	6 0	20 0
,,	1-30 gr.	6 0	20 0
,, and Iron		8 0	28 0
,, Iron and Quinine		17 0	63 6
,, and Nux Vomica		7 0	24 0
,, Nux Vomica and Iron		8 0	28 0
,, and Quinine		17 0	63 6
,, Quinine, Iron, & Strychnine		17 0	63 6
,, and Valer. Zinc		11 0	39 6
Picrotoxin	1-80 gr.	7 0	24 0
Podophyllin	1-8 gr.	5 0	16 0
,,	1-4 gr.	5 0	16 0
,,	1-2 gr.	5 6	18 0
,, Comp.		8 0	28 0
Quinine, Bi-Sulphate	1-4 gr.	5 0	16 0
,, ,,	1-2 gr.	5 0	16 0
,, ,,	1 gr.	5 0	16 0
,, ,,	2 gr.	7 6	26 0
,, ,,	3 gr.	10 6	38 0
,, ,,	4 gr.	13 0	48 0
,, ,,	5 gr.	16 0	60 0
,, Sulphate	1-4 gr.	5 0	16 0
,, ,,	1-2 gr.	5 0	16 0
,, ,,	1 gr.	5 6	18 0
,, ,,	2 gr.	8 0	28 0
,, ,,	3 gr.	11 0	40 0
,, ,,	4 gr.	14 0	52 0
,, ,,	5 gr.	17 0	64 0
,, Comp. (Anti-malarial)		15 0	55 6
Rhubarb Comp., B.P.	5 gr.	7 0	24 0
,, ,, and Blue Mass	5 gr.	7 0	24 0
Rhubarb, Ipecac. and Soda		7 0	24 0
Salicylic Acid	2 gr.	7 0	24 0
,, ,,	5 gr.	11 0	39 6
,, Comp.		16 6	63 0
Soap Comp., B.P.	5 gr.	8 0	29 0
Squill Comp., B.P.	5 gr.	5 6	18 0
Strychnine	1-50 gr.	5 0	16 0
Zinc. Phosphide	1-4 gr	7 0	24 0
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,, Valerianate	1 gr.	8 6	30 0

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LABORATORY NOTES.*

BY DR. B. H. PAUL.

Although analytical practice does not generally come within the scope of the pharmacist's business in this country to such an extent as it often does on the continent there is reason for believing that occupation of this kind might be made a remunerative adjunct to the more ordinary routine, and in country places especially it would be worth while for the pharmacist to provide in this way for a want that is constantly becoming more general in regard to a variety of technical matters. In any case practical skill in analytical operations is a qualification that is now necessary to every pharmacist for the purposes of his own business, in order to command the confidence of the public and to avoid being interfered with under the provisions of the Food and Drugs Act. It is from this point of view that I am inclined to think that the subjects set down for consideration this evening may be of interest to the members of this Society.

1. The Tests of Quinine Sulphate.

Although some of the facts to which I propose to refer in connection with this subject do not in themselves possess any great novelty, the special attention they have lately received in various quarters gives them a new interest at the present moment.

Among all the salts of cinchona alkaloids quinine sulphate is undoubtedly the most important in every respect, and therefore especial attention should be given to the means of ascertaining its purity. Quite lately it has been contended, that in regard to this character it is the duty of the pharmacist to enforce upon the manufacturer very stringent demands, and from an ethical point of view nothing can be said to the contrary, especially if it should be decided upon therapeutical grounds that it is desirable to use quinine sulphate in a state of absolute chemical purity. But that is a point to be determined by medical authority, and for the present it will suffice to consider what is to be understood by the term purity in this case as a matter of practical pharmacy. In doing so it will be important to bear in mind that however much we may be in a position at the present time to define the particulars which are evidence of the purity of quinine sulphate, it must be admitted that in regard to this salt the term purity has hitherto had only a relative application. With our present knowledge of the various alkaloids occurring in the material which is the source of quinine, it may be taken for granted that quinine sulphate is not likely to be naturally contaminated with cinchonine sulphate, or, indeed, with any other cinchonine salt as an accidental admixture, and hence, for practical purposes, this impurity may be to a great extent left out of consideration. For various other reasons, true quinidine sulphate may also be disregarded in this respect as being an unlikely admixture, and, in a general way, attention may be confined almost entirely to cinchonidine sulphate as being the impurity most frequently present in commercial quinine sulphate. The intrinsic value of the cinchonidine salt is very much less than that of quinine sulphate. Consequently from this point of view alone, independently of therapeutic value, it is very important to ascertain the presence and amount of this impurity in the quinine sulphate of commerce.

When we call to mind the fact that cinchonidine is almost always associated with quinine in the bark from which quinine sulphate is manufactured, and also the fact that up to the year 1844 cinchonidine was not known as an independent substance distinct from quinine, it will be evident that there is, on these grounds alone, very good reason for believing that prior to the date mentioned the article known as quinine sulphate was really a mixture of the sulphates of quinine and cinchonidine. It would be possible to mention in support of this view many circumstances recorded by trustworthy observers, but I will merely refer to the fact lately made known by Dr. de Vrij that the quinine sulphate originally manufactured by Pelletier contained a considerable amount of cinchonidine.

Winckler's identification of cinchonidine, in 1844, was coincident with the introduction of bark from New Grenada, to supply the place of the Bolivian bark that had been previously used for the manufacture of quinine, and the fact that this New Grenada bark contained a much larger amount of cinchonidine than Bolivian bark was, no doubt, the circumstance which led to the identification of the alkaloid. Unfortunately, Winckler gave it the name of "quinidine," and very shortly afterwards the sulphate of this alkaloid was met with in commerce under the name of "quinidine." At the 1851 Exhibition it was shown by Zimmer, of Frankfort, and a prize was then awarded to his firm for its production in a separate form. Probably it had been used long before as an adulterant of quinine sulphate, and as the methods of testing the purity of quinine sulphate in use at that time were not calculated to detect the presence of the cinchonidine salt, there is also a probability that it was often present to a considerable amount in commercial quinine sulphate as an accidental and to a large extent quite unrecognized impurity, originating from the material used. The literature of that period indeed furnishes abundant evidence of this, and several new methods of testing were then suggested for the detection of cinchonidine. None of them, however, were thoroughly effectual, and the official tests given in the various pharmacopœias were all of such a nature that a considerable amount of cinchonidine salt would pass unrecognized. That has, indeed, been the case up to the present time.

It is evident, therefore, that the presence of cinchonidine sulphate in commercial quinine sulphate cannot be regarded as a matter of any novelty, either as an unrecognized accident before 1844, or as a well understood fact since that time; but that, on the contrary, it was a natural consequence of the association of cinchonidine with quinine in all the varieties of material employed for the manufacture of quinine sulphate. The question as to the purity of this salt, apart from actual falsification, has therefore always been a question as to the actual amount of cinchonidine it contained. It is mainly in regard to this particular point that the value and efficiency of the tests applied for ascertaining the purity of quinine sulphate require to be considered, and it is now just ten years ago that I pointed out the defective nature of the test prescribed in the British Pharmacopœia of 1867. I then showed that by the application of the Pharmacopœia test a sample

* Read at an Evening Meeting of the Pharmaceutical Society, Wednesday, February 9, 1887.

of quinine sulphate containing at least 10 or 15 per cent. of cinchonidine sulphate could not be distinguished from one of absolute purity, or containing no more than one per cent., and that while there were some manufacturers who supplied the article in a comparatively high state of purity, that obtained from other sources often contained a large amount of the cinchonidine salt. The existence, even in the past, of such differences in the quality of a medicinal agent so important as quinine sulphate, and the possibility of their recurrence, should certainly induce pharmacists to give attention to this matter, and to verify the quality of their supplies by careful examination, not only for the sake of their own protection, but also for the purpose of enabling them to furnish a personal guarantee as to the purity of this article.

The methods of testing quinine sulphate for ascertaining its purity and detecting the presence of salts of the other cinchona alkaloids are for the most part based upon the relative solubility of those alkaloids in ether or in ammonia, and partly, also, upon the relative solubility of the neutral sulphates of those alkaloids in water. As already mentioned, the problem to be solved, under ordinary conditions, is a simple one, and it may be stated in these terms, What is the amount of cinchonidine sulphate present? The ether test was first applied for this purpose in 1852. It consisted in shaking a weighed quantity of the sulphate in question with ether and ammonia in a test tube, and if the alkaloid set free by the ammonia was completely dissolved by the ether, forming a clear solution, the sulphate was considered to be free from objectionable impurity. But the ether test thus applied is not sufficiently delicate for the purpose required. Freshly precipitated quinine dissolves readily in a very small proportion of ether, and the solution remains quite clear if the evaporation of the ether be prevented. Cinchonidine is also soluble in ether, but to a very much smaller extent. Thus, for example, 10 grains of quinine sulphate treated in this way, with 1 drachm of ether and some ammonia, will give a clear solution; but 1 grain of cinchonidine sulphate gives a very different result when so treated, a large portion of the alkaloid remaining undissolved by the ether. The actual limit of solubility of cinchonidine in ether is reached when the sulphate is in the proportion of about half a grain to the fluid drachm of ether. Hence, it might be expected, that when this test is applied to a sample of quinine sulphate containing 10 per cent. of cinchonidine sulphate, the presence of this impurity would be ascertainable. That is not the case however. When such a sample is tested in this way, the whole of the alkaloid is dissolved, forming a clear solution, and there is no indication of the presence of cinchonidine. The fact is, that an ether solution of quinine dissolves more cinchonidine than an equal volume of ether does. The practical result is that the ether test applied in the manner just described will not in any case indicate the presence of cinchonidine unless its amount is upwards of 10 per cent. at least.

It was partly in this respect that the ether test as prescribed in the British Pharmacopœia, 1867, the French Codex, 1866, and the United States Pharmacopœia, 1870, was defective. In each case also there was the further mistake of directing too large a proportion of ether to be used. Half an ounce of ether, the quantity to be used, according to the B.P., with 10 grains of the quinine sulphate to be tested, is capable of dissolving 2 grains of cinchonidine, and the 5 grams of ether to be used with half a gram of the salt according to the Codex, is sufficient to dissolve 0·0686 gram of cinchonidine, these quantities corresponding in one case to about 20 per cent., and the other to 13 per cent. of cinchonidine sulphate that would escape recognition by the test. So far, therefore, as those official standards were concerned, it is again evident that the purity of quinine sulphate must be regarded as having had up to within a very recent period only a relative significance.

In the German Pharmacopœia of 1872 Kerner's test was adopted, and it has since been adopted in the United States Pharmacopœia of 1880. It is based upon the fact that quinine is much more soluble in ammonia solution than any other cinchona alkaloid. When a cold saturated solution of neutral quinine sulphate, containing only from $\frac{1}{700}$ to $\frac{1}{800}$ of its weight of the salt, is mixed with ammonia solution, the alkaloid precipitated in the first instance is readily dissolved again by adding more of the ammonia solution. If a volume equal to that of the quinine sulphate solution be added the mixture becomes quite clear. When, however, a saturated solution of cinchonidine sulphate is treated in the same manner the result is very different, because cinchonidine is so very much less soluble in ammonia solution than quinine. Here then is a means of distinguishing between these two alkaloids, and the further difference existing between the sulphates of these alkaloids, in their solubility in water at the normal temperature, admits of this means of distinction being applied as a test for the presence of cinchonidine sulphate in quinine sulphate. The way in which this is done may be explained most readily by taking as an example the case of quinine sulphate containing 10 per cent. of the cinchonidine salt, and applying the test as directed in the German Pharmacopœia.

One gram of such a salt will contain 0·99 gram quinine sulphate, and 0·01 gram of cinchonidine salt.

The first step is to separate the two sulphates by means of their very different solubility in water.

For this purpose the sample to be tested is shaken with ten times its weight of cold water, and if the two sulphates were taken up in proportion to their respective solubility in water, the cinchonidine sulphate dissolved would be seven times as much as the quinine sulphate, since cinchonidine sulphate is soluble in about 100 parts of water; while quinine sulphate requires about 700 parts for solution.* That is the assumption upon which Kerner's test was founded, and if it were correct, the solution obtained by shaking 1 gram of quinine sulphate containing 10 per cent. cinchonidine sulphate with 10 c.c. of water would contain 0·0143 gram quinine sulphate and 0·1 gram of cinchonidine sulphate. If such a solution were really obtained under the conditions mentioned, Kerner's test would be a very delicate one. But that is not the case. The solution of the

* The solubility of neutral quinine sulphate is given somewhat differently by authorities, and it is not always quite the same for different samples. Taking the range of variation above mentioned the quantities contained in 10 c.c. of the solution will be as follows—

For a solubility of 1 part in			10 c.c. of the solution will contain gram
700	parts of water at 60° F.	. . . .	·0143
755	,, ,,	. . . .	·0132
800	,, ,,	. . . .	·0125

sulphates is not determined altogether by their respective solubility, and for various reasons it does not take place at the normal temperature in these proportions so readily as might be expected. The consequence is that in applying this test to quinine sulphate containing cinchonidine sulphate only a portion of the latter salt is dissolved, and the portion which is not dissolved escapes detection. This fact was pointed out by me ten years ago, in the paper which I read at one of these evening meetings; but as the test is described in the German and the United States Pharmacopœias it has not received sufficient attention. Practically considered, the result is that Kerner's test is not much better than the ether test already described, although it would be a very delicate one if rightly applied.

It is altogether useless to apply so delicate a test for cinchonidine, unless in making the solution to which ammonia is applied that alkaloid is really dissolved out of the sample to be tested. This is not done when cold water is used. Whether it be due to the slow action of cold water upon cinchonidine sulphate, or to the existence of a double salt, the result is the same, part of the cinchonidine remaining undissolved and thus escaping notice. I may here mention that I think there is some reason for believing part of the cinchonidine may be present in a free state, as it frequently happens that quinine sulphate has a decided alkaline reaction. If this be the case the insufficiency of Kerner's test in such a case would be quite intelligible.

The same test is adopted in the French Codex, and the conditions I have shown to be necessary are to some extent provided for by a slight modification intended to meet the difficulty that has just been mentioned. That consists in warming the mixture of quinine sulphate and water by immersing the tube in warm water, and then cooling the solution to a temperature of 15° C. before adding ammonia to the filtered liquid. It has been found, however, that mere warming is insufficient to ensure the solution of all the cinchonidine salt that may be present in a sample of quinine sulphate, and that consequently the application of the test in this way cannot be relied upon to afford trustworthy indications of the purity of quinine sulphate. For that purpose it is essential that the quinine sulphate tested should either be dissolved in boiling water, or at least heated to the boiling point with nearly enough water to dissolve it at that temperature. It is only in this way that the whole of the cinchonidine sulphate can be dissolved and brought into a condition to be recognizable on the subsequent addition of ammonia.* The Commission appointed by the Pharmaceutical Society of Paris to inquire into this subject has, after some months of investigation, also arrived at the same result, and therefore recommended that the mixture of quinine sulphate and water should be heated to the temperature of 60° C. But that is not sufficient to ensure the detection of all the cinchonidine salt that may be present, nor do I think that it is in any case, from an analytical point of view, a mode of procedure sufficiently precise to furnish trustworthy results as to the actual amount of cinchonidine sulphate. For various reasons, economical or therapeutical, it may be advisable or expedient to recognize a certain limitation of the purity to be demanded in quinine sulphate; but that would be most appropriately done by specifying the amount of cinchonidine salt that is to be allowable. Such a practical regulation of the matter does not, however, constitute any reason for making analytical methods less precise and analytical results less accurate than is consistent with the knowledge at our command. Any test that provides for overlooking some portion of a substance to be detected must be distrusted as unsafe.

In the present British Pharmacopœia the facts that I have previously pointed out have now been taken cognizance of and in accordance with them an improved modification of the ether test is adopted for the testing of quinine sulphate. Here the impossibility of obtaining correct results when operating directly upon the sulphate to be tested is overcome by having recourse in the first instance to a fractional solution of the salt by heating it with water to the boiling point, and then, after cooling and recrystallization of the quinine sulphate, applying the ether test to the cold mother liquor. By this means the greater part, if not all of the cinchonidine salt will be dissolved, while the proportion of quinine sulphate remaining associated with it in solution will be so minimized as to admit of the presence of cinchonidine being detected by the formation of a crystalline deposit either immediately or after the lapse of some hours.

Taking a sample containing 10 per cent. of cinchonidine, boiling 10 grains of it with 5 fluid drachms of water, then cooling to 60° F., and filtering, such a solution is obtained. To get a good result the solution should be evaporated to about one-fifth its volume before being shaken with ether and ammonia, and then the presence of cinchonidine will be distinctly indicated. Even 1 per cent. of cinchonidine sulphate can be detected in this way with certainty,* and it is very easy to tell whether any sample of quinine sulphate comes within the limit of purity fixed by the Pharmacopœia of "not much more than 5 per cent."

In regard to the testing of quinine sulphate the British Pharmacopœia is now decidedly in advance of other pharmacopœias. The ether test as there applied is more to be relied upon than Kerner's ammonia test, even when a boiling temperature is applied in making the solution, because the manipulation is more simple, and the cinchonidine can be actually weighed instead of being estimated from the quantity of ammonia solution required to dissolve it. There are also possible sources of error in the ammonia test which do not apply in the other case. Perhaps the best testimony to the excellence of the modified ether test is, however, to be found in the circumstance that very shortly after the reading of my paper here it was adopted and specially recommended by so high an authority on this subject as Dr. Hesse, who published with that object a paper in the *Archiv der Pharmacie*, describing a mode of applying this test which has been commonly referred to since as Dr. Hesse's test.

But to return to the test of the British Pharmacopœia. So far as concerns the details hitherto mentioned the principles to be observed are correctly applied; but I think it is unfortunate that the addition of acid should have been directed in making the solution, for except in so far as perfect neutralization is concerned, every drop of acid added proportionately

* Even then more than one recrystallization will generally be requisite.

* When the amount of cinchonidine is small it is requisite to leave the closed tube for twelve hours or longer for the formation of the crystals to take place.

invalidates the result by introducing into the mother liquor so much the more quinine, and thus, for the reason already mentioned, reducing the delicacy of the test for cinchonidine. Another objectionable feature of this test is the treatment of such a large volume of liquid with ether and ammonia. Five ounces of the solution will dissolve at least half an ounce of ether before there is any separation of ether to dissolve the alkaloid, and in that way a liquid will be produced which is itself a solvent of cinchonidine to such an extent as to interfere with the indications of its presence. The proper mode of operating would be to evaporate the mother liquor of the crystallization to a small bulk before treating it with ether and ammonia, and then the result of the test would be much more distinct and accurate.

2. Determination of Caffeine.

The method adopted for this purpose, and described in the *Pharmaceutical Journal* a few weeks ago, by myself and Mr. Cownley, has since then been applied to the examination of a number of different samples of coffee from various sources, and we have found that in accordance with the view we then suggested as being probable, the amount of caffeine in coffee berries is a tolerably constant quantity. For the samples examined, we are indebted to the kindness of Messrs. Patry and Pasteur, who very obligingly provided us with material representing the produce of different countries where coffee is grown upon the large scale. In these further analyses, for carrying out which I am indebted to Mr. Cownley, the coffee berries have first been dried at 212° F., since it was found very difficult to reduce them to powder when in the air-dried condition. The figures in the following table, therefore, apply to the dried raw berries, and the results previously published, have been corrected so as to allow for the amount of moisture in the berries.

Kinds of coffee.	Moisture per cent.	Caffeine. Berries dried at 212° F. per cent.	Caffeine. Air-dried berries. per cent.
Coorg	8·0	1·20	1·10
Guatemala ...	8·6	1·29	1·18
Travancore ...	10·0	1·29	1·16
Liberian	8·0	1·30	1·20
Liberian	8·0	1·39	1·28
Rio	9·1	1·20	—
Santos Brazil..	9·0	1·29	—
Manila	6·6	1·20	—
Ceylon	6·2	1·24	—
Perak	7·3	1·22	—
Costa Rica ...	7·2	1·24	—
Pale Jamaica..	8·7	1·21	—
Mysore	8·0	1·28	—
Jamaica	9·0	1·28	—

It is evident from the results quoted in this table that the discordant statements hitherto published in reference to the amount of caffeine in coffee must be ascribed to defective methods of analysis, and that, in reality, the determination of the amount of caffeine in a sample of coffee by the method we have described would be one of the most conclusive data to rely upon in any question as to the adulteration of coffee.

3. Cocaine Hydrochlorate.

In a recent number of 'Ephemeris,' Dr. Squibb has put forward a statement in reference to the condition in which this salt should be employed in medicine and pharmacy, that may be considered rather remarkable as coming from him. He proposes that the cocaine as extracted from the coca leaves should be converted into hydrochlorate, and that this salt should be reduced to a dry state by evaporating the solution with constant stirring until a granular crystalline mass remains. Such a product would probably always contain a certain proportion of uncrystallizable material, which Dr. Squibb thinks is physiologically equal to the crystallizable portion, and he recommends that the whole should be mixed together for use in medicine, because the separation of the uncrystallizable portion would entail considerable loss. Having lately had occasion to operate upon a large quantity of crude cocaine, as it is now imported from South America, my experience of this article has led me to disagree with the opinion expressed by Dr. Squibb, as to the propriety of allowing uncrystallizable hydrochlorate to be mixed with the crystallizable salt. I find that there is no difficulty in obtaining the salt in a finely crystalline condition, quite colourless and quite free from odour. It is, indeed, produced in this condition by several manufacturers, and for many of the purposes to which it is applied this appears to be the only suitable form of the salt.

[*The discussion on this paper is printed at p.* 655.]

DRUGS AND DIGESTION.*

BY ROBERT G. ECCLES, M.D.

(*Concluded from page* 591.)

In a former paper upon peptonization your essayist declared that the tinctures tried up to that time seemed to retard no more than the alcohol they contained. This has since proved to be a grave mistake. Only a few had been tried, and they under the influence of comparatively large quantities of pepsin. Up to that time, too, the method had been to digest a given time and weigh the remaining albumen. This plan was subject to such grave perturbations that it was finally abandoned for the better one of completing the digestion and taking the time consumed as a standard. A large number of tinctures were submitted to this method with the following results. The control time was again two hours. One gram of each was added to the 50 grams of fluid.

Tinctures.

	h.	m.		h.	m.
1. Chloride of iron	over 10	0	25. Digitalis . . .	3	35
2. Iodine co. .	over 10	0	26. Physostigma .	3	35
3. Chloride of iron (tasteless) .	over 10	0	27. Colocynth co. .	3	30
4. Guaiaci .	over 10	0	28. Modif'd Warb'rg	3	30
5. Guaiaci am.	over 10	0	29. Avena sativa .	3	30
6. Lupulin .	over 10	0	30. Santal . . .	3	30
7. Belladonna . .	9	5	31. Gentian co. . .	3	30
8. Warburg's . .	8	50	32. Sanguinaria . .	3	30
9. Cannabis ind. .	8	50	33. Cinchona simp. .	3	30
10. Opium . . .	8	15	34. Nux vomica . .	3	20
11. Benzoin co. . .	6	45	35. Cascarilla . .	3	20
12. Benzoin simp. .	6	10	36. Senega . . .	3	20
13. Verat. virid. .	5	30	37. Capsicum . .	3	10
14. Cubeb	5	30	38. Hops	3	0
15. Buchu	5	30	39. Gentian . . .	3	0
16. Aloes and myrrh	5	30	40. Orange peel . .	3	0
17. Valer. of am. .	5	30	41. Galls	3	0
18. Hyoscyamus .	5	20	42. Senna	3	0
19. Asafœtida . .	4	45	43. Lobelia æther .	3	0
20. Tolu	4	45	44. Krameria . .	3	0
21. Kino	4	10	45. Quassia . . .	3	0
22. Myrrh . . .	4	0	46. Valerian . . .	3	0
23. Catechu . . .	3	45	47. Aloes	4	0
24. Colchicum root	3	35	48. Colchicum seed .	3	0
			49. Cinchona co. .	3	0
			50. Stramonium .	2	55

* Read before the Brooklyn Pathological Society, Nov. 11, 1886. From the *New York Medical Journal.*

	h.	m.		h.	m.
51. Cardam. simp.	2	45	63. Aconite root	2	30
52. Cardam. co.	2	45	64. Aconite leaf	2	30
53. Lobelia	2	45	65. Lem'npeel (fresh)	2	25
54. Squills	2	45	66. Opium, camphorated	2	20
55. Rhubarb co.	2	45	67. Colombo	2	15
56. Cinnamon	2	45	68. Angustura	2	10
57. Ginger	2	40	69. Cochineal	2	10
58. Cantharides	2	40	70. Virg. snakeroot	2	10
59. Lavender	2	40	71. Conium	2	10
60. Ipecac. co.	2	30	72. Arnica	2	10
61. Poke	2	30	73. Dilute alcohol	2	5
62. Rhubarb	2	30			

On another trial with ½ gram each of those that failed to complete digestion in the ten hours, the following results were had :—

	h.	m.
1. Tincture of chloride of iron	over 10	0
2. „ iodine co.	9	35
3. „ chlor. iron (tasteless)	6	50
4. „ guaiaci	6	10
5. „ guaiaci ammon	6	10
6. „ lupulin	5	50

Tincture of the chloride of iron did not show just how thoroughly it retarded until the quantity was cut down to 2 cg., or 1 part in 2500. Here, then, is the worst tincture in the whole list, and it turns out to be the very one that theory has led physicians to almost universally prescribe with meals. Fortunately the usual dose is so small that it can do no great amount of harm. But why let it do any? Is it not just as well to administer it between meals, and allow our pale anæmic patients the advantage of strength from their food as well as a richer oxygen supply in the blood? If we must give a tincture of iron with the meals then we had better use Creuse's tasteless. Even it retards to an injurious extent, and would be better given between meals. Some of the tinctures that are rarely, if ever, administered internally have the least retarding effect.

The principal organic bodies used in medicine and surgery and not related directly to those already given constitute the next table. With every one of these 15 cg. was the amount used, and two hours constituted the control time.

Organic Substances.

	h.	m.		h.	m.
1. Beta naphthol	4	50	12. Sweet spirit of nitre	2	15
2. Santonin with 2 grams alcohol.	4	45	13. Acetic ether	2	15
3. Chloroform	4	40	14. Benzole	2	15
4. Menthol	3	40	15. Salicin	2	5
5. Nitrite of amyl	3	30	16. Ethyl alcohol	2	0
6. Croton chloral	2	45	17. Methyl alcohol	2	0
7. Chloral hydrate	2	40	18. Paraldehyde	2	0
8. Vanillin	2	40	19. Urea	2	0
9. Antipyrine	2	15	20. Milk sugar	2	0
10. Concent. sulph. ether	2	15	21. Cane sugar	2	0
11. Powdered gum arabic	2	15	22. Glycerin	2	0
			23. Santonin without alcohol	2	0

The last eight all came out of the bath with the control experiment, thus showing that there was no retarding effect. No. 23 being insoluble was corrected by No. 2, where it was put into solution with alcohol. With six of the other seven it took six trials to discover their retarding effect. Urea caused a delay of twenty minutes when raised to 30 cm. Methyl alcohol with 3 grams delayed digestion one hour and thirty minutes beyond the control time, paraldehyde with the same amount was ten minutes behind this, and ethyl alcohol half an hour still longer. When 8 grams of white sugar were added to the 50 grams of digestive fluid a delay of one hour and five minutes over the usual two hours occurred, and when the same amount of sugar of milk was put in it took twenty minutes more than this. It would almost seem from these results that every article used in medicine had some little retarding power that would reveal itself on using it in large enough percentage. White sugar had the least of any of those tried. Milk sugar, so commonly mixed with pepsin to form the saccharated, is of no earthly advantage in it, and is really an injury to its value. The same is true of glycerin, where it is to be put to use at once. Six grams of glycerin in a 50 gram mixture retard half an hour beyond the control time. As an antiseptic to protect the pepsin from bacteria its utility is unquestionable. Common or ethylic alcohol in half the amount delays twice as long, so that a wine of pepsin is not so scientific as a liquid pepsin, although it is not so bad as some investigators have tried to make us believe. The usual dose of wine of pepsin, diluted with the contents of the stomach after a meal, will reduce the alcohol to considerably less than 1 per cent. When in this proportion its effects are inappreciable, and besides this the alcohol must all rapidly leave the stomach and allow the pepsin to act unaffected. This is probably what occurs where people are in the habit of drinking beer or wine with their meals. After stimulating the peptic glands a little it rapidly diffuses itself through the system, and as it has no permanent ill effect upon the digestive ferment that at once assumes its proper duties. Along with the organic compounds of the last table a trial was made of two compound cathartics and two "after-dinner" pills in separate bottles. They came out together fifteen minutes after the control bottle, showing that their effects upon the digestive fluid are but slight. What their presence in the stomach might do by producing slight nausea and inhibiting the action of the digestive glands is another question that can only be answered by experiments upon patients. Of the fluid extracts but fifteen were tried. All of these except rhubarb came out on the first trial when 1 gram was used. It afterwards came out in five hours when reduced to ½ gram. Control time, two hours.

Fluid Extracts.

	h.	m.		h.	m.
1. Aconite	2	20	8. Digitalis	3	20
2. Valerian	2	30	9. Wild cherry	3	30
3. Taraxacum	2	30	10. Buchu	3	30
4. Licorice	2	30	11. Cascara sagrada	3	30
5. Gentian	2	40	12. Buckthorn	3	30
6. Ergot	2	40	13. Guarana	3	50
7. Colchicum root	3	10	14. Hyoscyamus	3	50

We come now to the consideration of inorganic substances and their effects upon digestion. It is no doubt unnecessary to remind you of the fact that no peptic digestion is possible without some acid, and that therefore all alkalies, alkaline carbonates and such forms of matter as are acted upon by hydrochloric acid are contra-indicated when digestion is going on, and must never be prescribed with pepsin. To order bicarbonate of sodium and pepsin in the same prescription displays lamentable ignorance on the part of any physician, and yet it is frequently done. As well might you fasten two horses of equal strength back to back, and, by whipping them up, expect work to be done as to hope for any benefit to your patient from such a combination. If an excess of sodium is given and acetic fermentation is going on, of course the patient will experience an advantage from taking it, but he would have had still greater benefit if the pepsin had not been given with it. As an illustration of the retarding effect of a drug because of its consuming the acid, iron reduced by hydrogen will answer. This one was quite a surprise when first discovered, although it should not have been so, as the inference *à priori* of its action is simple. The longer the iron is kept in contact with the acid the more it retards. If put to digesting at once the addition of an extra supply of acid hastens the work. Fifteen cg. delayed digestion three hundred and ninety minutes after the two hours of the control experiment were up. By raising the acid strength to 0·4 per cent. the same amount only delayed two hundred and ten minutes.

The following list is that of the worst retarders yet found. Only 5 mg., or 1 part in 10,000, were necessary to produce the delay mentioned. The control time is already subtracted in this and all subsequent tables. The time is given in minutes only :—

	Minutes.
1. Molybdate of ammonium	190
2. Molybdate of sodium	180
3. Permanganate of potass	130
4. Chloride of platinum	60
5. Potassio mercuric iodide	60

The next list comprises those that allowed digestion to finish after delaying the indicated time when 1 cg., or 1 part in 5000, was used. The two hours of control time are subtracted :—

	Minutes.
1. Ammonio - ferric alum	330
2. Ferricyanide of potassium	320
3. Ferrocyanide of potassium	260
4. Sulphate of iron	130
5. Bichromate of potassium	130
6. Chromate of potassium	60
7. Sol. of perchloride iron	50
8. Salicylate of lithium	30
9. Chloride of gold	20
10. Bichloride of mercury	15
11. Sulphate of sodium	15
12. Sulphate of potassium	15

The following were tested from 150 up to 50 mg., and when of the latter strength they delayed as follows :—

	Minutes.
1. Ammonium sulphite	460
2. Magnesium sulphate	330
3. Iron and potass. tart.	290
4. Antimony and potass. tart.	100
5. Mercuric nitrate	80
6. Cadmium iodide	50
7. Sodium hyposulphite	20

The next long list is composed of such non-organic drugs as digested the submitted albumen in the time named, plus the two hours of control time, when 15 cg. were added to the 50 grams. The proportion was therefore 3 parts to 1000.

	Minutes.
1. Chloride of ammonium	320
2. Chloride of calcium	250
3. Chloride of sodium	200
4. Chloride of antimony	160
5. Chloride of potassium	90
6. Chloride of lithium	60
7. Bromide of iron	360
8. Bromide of ammonium	200
9. Bromide of lithium	120
10. Bromide of sodium	100
11. Bromide of cerium	90
12. Bromide of potassium	60
13. Iodide of potassium	200
14. Iodide of arsenic	190
15. Iodide of sodium	180
16. Iodide of ammonium	170
17. Iodide of lead	60
18. Iodide of calcium	5
19. Nitrate of sodium	450
20. Nitrate of potassium	390
21. Nitrate of strontium	380
22. Nitrate of uranium	310
23. Benzoate of sodium	160
24. Benzoate of ammonium	160
25. Benzoate of lithium	140
26. Benzoate of potassium	110
27. Sulphide of potassium	650
28. Sulphate of ammonium and alumin.	750
29. Sulphate of copper	720
30. Sulphate of magnesium	690
31. Hypophosphite of manganese	80
32. Hypophosphite of sodium	60
33. Hypophosphite of potassium	40
34. Chlorate of sodium	280
35. Chlorate of potassium	200
36. Acetate of sodium	30
37. Acetate of ammonium	30
38. Sulphocarbolate of zinc	140
39. Sulphocarbolate of sodium	80
40. Phosphate of iron	60
41. Phosphate of sodium	30
42. Salicylate of sodium	690
43. Salicylate of potassium	360
44. Valerianate of ammonium	60
45. Valerianate of zinc	30
46. Ammon. citr. of iron	410
47 Ammon. citr. of bismuth	90
48. Sulphite of sodium	330
49. Citrate of iron, U. S.	60
50. Oxalate of cerium	60
51. Lactophosphate of calcium	10
52. Biborate of sodium	10
53. Arsenate of sodium	10
54. Cyanide of potassium	5

A glance over this list shows that the sulphates are the most active inhibitors of digestion. Among the alkaloidal salts the same was the case. Why sulphate of quinine ever came to be so universally prescribed in preference to the much better chloride is hard to tell. The same is true of sulphate of morphine. In the chlorides there is more of the active principle to the same weight, they are much more soluble in the gastric juice, and they retard digestion less. Next to the sulphates the nitrates are the great retarders. The bromides average lower than the chlorides, while the latter are about even with the iodides. Bromide of iron ranges high, like many of the iron non-organic salts. Dialysed iron and the solution of pernitrate of iron retarded respectively one hundred and fifty and one hundred and ten minutes when 15 cg. were used, which is lower than the run of their class. The salicylates are far above the benzoates, and the chlorates hinder much more than than chlorides. The general run of all agrees very well with the activity of their acids, according to a preceding table. The next list comprises those having the least retarding power of any tried. When 15 cg. were used no effect could be perceived. The amount was therefore double, thus making 3 parts in 500.

1. Acetate of potassium	280
2. Citrate of potassium	90
3. Phosphate of calcium	60
4. Tartrate of potassium	50
5. Rochelle salts	20
6. Acetate of lead	5

It has been observed during this investigation that antiseptics average high as retarders, and an approach is made by them in this power that runs nearly parallel with their germ-destroying power. Potassio-mercuric iodide, the most potent germicide known, was found to hold back digestion one hour when only 1 part in 10,000 parts was used. Bichloride of mercury required but 1 part in 5000 to retard fifteen minutes. While there are substances not known to be germicides that retard still more, still it is somewhat curious to find this class range so high and at the same time occupying positions toward each other that suggest the order of their germ-destroying power. The molybdates seem to lead everything else as inhibitors, and they are the very best known precipitants of peptone. Homœopathists should make some "provings" upon the salts of molybdenum and use them as cures for dyspepsia. They would certainly have similar results from the drug as from the disease.

COMMERCIAL JALAPIN AND JALAP RESIN.*

BY EDMUND WHITE,
Bell Scholar.

Having several times met with the statement that the jalapin and jalap resin of commerce were not prepared from the official jalap derived from *Exogonium purga*, but from the roots of other convolvulaceous plants, I was

* Read at a meeting of the School of Pharmacy Students' Association, Thursday, January 20.

induced to enter upon some investigations on those two substances with the object of testing the accuracy of the statement I have just referred to.

The resin of the Pharmacopœia is directed to be prepared by exhausting jalap in No. 40 powder, by maceration and percolation with rectified spirit, adding water to the tincture thus produced and distilling off the spirit. The residue is removed while hot to an open dish and allowed to cool. The supernatant liquor is now poured off and the resin washed two or three times with hot water and dried in a stove.

Jalapin being unofficial one would be prepared for a good deal of variation in the article sold under this name. It is usually stated to be prepared by adding water to a tincture of jalap until a slight turbidity remains, then digesting with animal charcoal, evaporating the decolorized tincture to dryness, and washing the residue with hot water to remove gummy and saccharine matter and finally drying in a stove. It occurs in commerce in powder.

The convolvulaceous plants to which I have referred as the reputed source of jalapin and jalap resin are:—*Ipomœa simulans*, the dried root of which is known as Tampico jalap, and *Ipomœa Orizabensis*, from which is derived the variety of jalap known as male or woody jalap or Orizaba root. The latter is now seldom, if ever, met with in large quantities.

The resin obtained by means of alcohol from Vera Cruz jalap was examined by Mayer and found by him to consist really of two resins, one which he named convolvulin, constituting about 90 per cent. of the official resina jalapæ, and another present in much smaller quantity, to which the name of jalapin is given.

The resins occurring in the roots of *Ipomœa simulans* and *Ipomœa Orizabensis* have been said by Hanbury to consist entirely of jalapin. Evans, however (*Pharm. Journ.*, [2], x., p. 220), states that the resin from these two plants is only soluble to the extent of one-half in ether.

Now both convolvulin and jalapin are soluble in alcohol, but ether forms a ready means of separating the two, convolvulin being quite insoluble in ether, but jalapin readily soluble.

It is rather unfortunate, and confusing also, that the principal resin of Vera Cruz jalap should have received the name of convolvulin, while the less important one is known as jalapin, but these two names are now so well established that any attempts to reverse or alter them would only lead to greater confusion.

The formula of convolvulin is $C_{31}H_{50}O_{16}$; when pure, it is colourless, odourless, and tasteless; brittle when dry; melting at 150° C. Its melting-point is, however, considerably lowered by the presence of small quantities of moisture. It dissolves in aqueous solutions of alkalies, forming a convolvulinate of the base. By the action of warm dilute nitric acid ipomeic and oxalic acids are formed; ipomeic acid was at first considered to be a peculiar acid, but it has now been identified with sebacic acid. By dilute sulphuric acid or emulsin convolvulin yields glucose and convolvulinol, which is regarded as the anhydride of convolvulinolic acid.

The formula of jalapin is $C_{34}H_{56}O_{16}$. It will thus be seen to be homologous with convolvulin, from which it differs by the addition of $3CH_2$. Its decomposition products are also similar to those of convolvulin and by the action of dilute nitric acids upon it, ipomeic and oxalic acids are formed.

The point to decide then is, do commercial jalapin and jalap resin consist of convolvulin and jalapin, or of jalapin only? I say, *commercial* jalapin, because it is generally understood that the trade article represents the purified active principles of the official Vera Cruz jalap; but, as I have mentioned before, the resins obtained from that source consist mainly of convolvulin, true jalapin being only present to the extent of from 4 or 5 to about 10 per cent.

The investigations were carried out in the following manner:—

An apparatus was arranged for continuous percolation. A weighed quantity of resin, in fine powder, mixed with about three times its bulk of sand was placed in the percolating tube. This sand, in order to purify it, was previously treated with hot hydrochloric acid, then washed, dried, and sifted; pure ether was poured on to the mixture of sand and resin, and allowed to percolate until a quantity judged sufficient for exhaustion had collected in the flask below. The apparatus was now fitted together and heated on a water-bath, the percolation being allowed to continue until a small quantity of the ether dropping from the percolator left no residue by evaporation on a watch glass. The ethereal percolate having been poured out into a tared beaker the flask was carefully rinsed out with more pure ether, the washings being added to the contents of the beaker. This was now evaporated to dryness and the residue dried at a temperature of 100° C. until it ceased to lose weight. The product thus obtained corresponds to the jalapin of Mayer and Kayser.

To extract the convolvulin alcohol was next poured into the percolator, the same precautions being observed as with the ether. It was found, however, that the residue required drying for a longer time in order to obtain a constant weight. The beakers after removal from the drying oven were placed to cool under a bell-jar over sulphuric acid in order to prevent reabsorption of moisture while cooling. When alcohol failed to remove the whole of the material introduced into the percolator, the sand, of course, excepted, boiling distilled water was passed through it, and the portion removed by the water estimated in the usual way.

The amount of moisture present was calculated by drying a weighed portion of the powdered substance on a tared watch-glass for a hour and a half at a temperature of 100° C., and then weighing again.

By these means were obtained the figures which I have arranged in a tabular form showing the percentage composition of the two drugs as met with in commerce.

I examined eight specimens of jalapin and six of jalap resin, and obtained results which with four exceptions show that they are derived from true jalap. The specimens were drawn from various sources, the series being made as representative as possible of the commercial articles.

All the jalapins were in fine powder, and nearly white, specimens C. and E. having a very slight tinge of stone colour. From the figures yielded by analysis it would seem as if all but one had been derived from the root of *Exogonium purga*. One feature to be noticed was the absence of aqueous extractive. Both the ethereal and alcoholic residues were pale yellow, or nearly colourless and transparent when viewed in thin films. The ethereal residues, which, perhaps, represented nearly pure jalapin, had an irritating odour when hot, but this disappeared on cooling, and was succeeded by a rather pleasant coffee-like odour. They were all soluble in solution of caustic potash or soda, and gave with strong sulphuric acid, first a red and then a deep purple colour. In consistency they were stiff and tenacious, and even if dried for a long time could not be rendered quite hard. This is one of the characters of jalapin.

The percentage of jalapin in A. and D. will be seen to be rather less than that usually stated to be present in true jalap resin. This may be due to the fact that in order to obtain jalapin as colourless as possible, it is washed with a large volume of water, and by this washing a little of the jalapin, which is very slightly soluble in water, might be removed. Specimen "H." was purchased in 1877 from a well-known wholesale house; it is evidently not the resin of the true jalap, but consists of Mayer's jalapin and was probably derived from Tampico jalap.

Passing now to the alcoholic residues: they were

brittle when dry, thus affording a great contrast to the residues obtained by the evaporation of the ethereal percolate. They were soluble in solutions of the fixed alkalies; odourless and nearly tasteless (pure convolvulin is quite tasteless). When chewed they adhered to the teeth, and were slightly acrid in the throat. The amount of moisture present was inconsiderable, averaging from 2 to 5 per cent. It would appear, therefore, from these results that the so-called jalapin was not, chemically speaking, jalapin, but consisted, mainly, of convolvulin.

Turning our attention to the table of resins it will be seen that Nos. 1 and 2 only will correspond to the British Pharmacopœia tests. Nos. 1 and 2 resembled each other very much in physical characters. They were brittle and easily powdered, translucent at the edges and stronger in odour than the jalapins. No. 1 contained traces of aqueous extractive, probably owing to it having been incompletely washed.

No. 3, which shows such a high percentage of aqueous extractive, was nearly black in mass, tough and difficult to powder, The percentage of jalapin is not higher than it should be. The aqueous extractive was reddish-black, and brittle.

No. 4, which yielded such anomalous results, was brittle and easily powdered, and resembled to a great extent in appearance Nos. 1 and 2. The portion dissolved by the water was reddish-black and brittle when quite dry.

No. 5 was brittle and easily powdered, but very dark in colour. Slight traces of aqueous extractive were present.

No. 6, which yielded nearly half its weight to ether, had characters very similar to those of Nos. 1, 2 and 4.

The analysis of those six samples cannot be considered to have given satisfactory results, inasmuch as only two of them, Nos. 1 and 2, answer to the test required of the true jalap resin. No. 3 has evidently been unskilfully or carelessly prepared, but the proportion of jalapin is not higher than that sometimes found in jalap resin. Nos. 4, 5 and 6 yielded results which are very difficult to account for. Their composition can only be explained on the assumption that they were either a mixture of the two resins or that the resins of *Ipomœa simulans* aud *I. Orizabensis* are not of constant composition. The percentage of moisture in the resins was from 3 to 6 per cent. The ethereal residues resembled those obtained from the jalapins in being plastic and tenacious, but were of a reddish-brown colour. The odour was also very similar, but somewhat stronger.

The alcoholic residues were brittle, brownish in colour, and translucent. They were nearly tasteless, and had an odour resembling that of the resin from which they were obtained, but much fainter.

Composition of "Jalapin" in 100 *parts.*

	Ethereal extract.	Alcoholic extract.	Aqueous extractive.
A	3·5	94·8	none
B	4 3	91·5	,,
C	4·9	90·6	,,
D	3·3	92·6	,,
E	6·7	89·2	,,
F	6·8	87·9	,,
G	7·3	87·8	,,
H	all soluble	none	,,

Composition of "Jalap Resin" in 100 *parts.*

No.	Ethereal extract.	Alcoholic extract.	Aqueous extractive.
1.....	7·8	88·2	traces
2.....	7·2	89·2	none
3.....	8 4	72·4	16·6
4.....	77·8	16·6	3·1
5.....	25·6	72·0	traces
6.....	46 0	50·4	none

MILKY JUICE OF CERTAIN EUPHORBIACEÆ.*

BY G. HENKE.

Hitherto euphorbone had not been obtained in a pure state, even Flückiger, who proposed the name, was unsuccessful. The author treated finely powdered euporbium in the cold with light petroleum of 60° to 70° boiling point; this treatment being repeated as long as anything was dissolved. The solutions obtained were mixed, filtered, and allowed to evaporate spontaneously. The sides of the evaporating vessel became coated with beautiful, transparent, crystalline needles of euphorbone, whilst the remainder of the residue consisted of a yellowish, crystalline, warty mass. Repeated treatment with light petroleum gives a pure product finally, but is wasteful; it is better to dissolve the yellow mass in ether after removing the petroleum by heating on the water-bath; on adding alcohol until a faint turbidity appears, filtering and allowing to remain, a yellow, resinous mass separates. The liquid on evaporation leaves a snow-white, butter-like mass which gives brilliant needles on crystallizing from a sufficiently dilute solution of light petroleum. *Euphorbone* thus prepared melts at 67° to 68°, its composition was found to be $C_{20}H_{36}O$. Its rotatory power dissolved in chloroform was $[\alpha]_D = +15{\cdot}88°$. Its crystals are persistent in the air, tasteless, and are neutral in solution. It is very soluble in light petroleum, chloroform, ether, alcohol, benzene, acetone, and 90° vol. per cent. alcohol, less soluble in more dilute alcohol. It is unaffected by dilute acids, sodium carbonate, ammonia, potash, and soda, and by alcoholic zinc chloride solution. It is soluble in 10,000 parts of hot water. Cold anhydrous acetic acid does not affect it; when heated at 150° to 200° a solution is obtained from which a yellowish precipitate is thrown down on diluting with much water, this precipitate has the properties of unchanged euphorbone. Bromine acts violently on the compound, producing a yellow, resin-like, non-crystallizable mass. Hot nitric acid dissolves euphorbone, and from the solution an amorphous, nitrogenous compound can be obtained. A granular oxidation product was obtained by long boiling with potassium dichromate and sulphuric acid. On heating euphorbone with phosphoric anhydride, heptane, octane, xylene and small quantities of other aromatic hpdrocarbons were obtained. The residue from the preparation of euphorbone, when extracted with alcohol, yielded two resins, one soluble and the other insoluble in ether; their reactions are detailed. The detection of malic acid, gum, and other substances in the residue and the extraction therefrom are described. The pure euphorborium was found to contain:—Euphorbone, 34·60; resin soluble in ether, 26·95; resin insoluble in ether, 14·25; caoutchene, 1·10; malic acid, 1·50; gum and salts precipitated by alcohol, 8·10; gum and salts not precipitated by alcohol, 12·30; salts and organic substances soluble in ammonia, 1·20 per cent. Somewhat similar results were obtained in the case of juices of other plants of the euphorbia class.

PRESERVATION OF FLOWERS.

The *Chronique Industrielle* states that flowers may be preserved, with all their brilliancy and freshness, in the following way:—In a well-corked bottle, dissolve six drachms of coarsely cracked, clear gum copal, mixed with the same weight of broken glass, in 15½ ounces (by weight) of pure rectified sulphuric ether. Soak the flowers in this mixture, take them out slowly, and expose them to the air for ten minutes; then immerse them anew, and again expose them to the action of the air. Repeat this operation four or five times. The flowers thus treated will keep for a long time if care be taken not to handle them too much.—*Journ. Royal Micros. Soc.*

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DEATH BY POISON.

THE publication of the annual report of the Registrar-General again offers an opportunity of taking a retrospective glance at the records of those deaths ascribed to poison, which have an especial interest for pharmacists by reason of the fact that it is commonly assumed the articles which in such cases are the cause of death are obtained through their hands. That assumption is to a large extent incorrect, under the conditions actually existing, and in view of the possibility of a legislative measure relating to the sale of poisons being introduced into Parliament by the Government it will not be inappropriate to take this opportunity of illustrating the extent to which death by poison, either accidental or by suicide, has been caused by poisons of those kinds which can be obtained from extra pharmaceutical sources. The year 1885, to which the report now published applies, was remarkable for the small ratio of violent deaths as compared with any preceding years of the period during which these reports have been issued. The total number of such deaths was 17,268, and of these 14,939 are classed as being due to accident or negligence, and 2007 as suicidal. There has been a great reduction in the deaths from accident, and the total mortality from suicide, which had been gradually increasing in recent years, was lower than in any year since 1878. From the classification of the deaths by accident and suicide according to particular causes it appears that out of the 14,939 under the general head of accident or negligence 343 are recorded as due to poison, and out of the 2007 under the head of suicide 280 are recorded as being due to poison. The total number of deaths by poison during the year is, therefore, 623, or rather less than 3·7 per cent. of the total deaths by accident, negligence and suicide. Of the deaths by suicide 13·95 were caused by poison, but of the deaths by accident or negligence only 2·29 are recorded as having been due to poison. So far as the public safety is concerned in connection with the sale of poisons, it is, therefore, satisfactory to find that as compared with other causes of death by accident or negligence, neither the actual number nor the relative proportion of deaths thus caused by poison is considerable. In the case of suicide, as might be expected, the proportion of deaths due to poison is larger; but even in this case it is in fact one of the causes to which the smallest number of deaths is due. Among the deaths by suicide from poisoning, the number of males was about 75 per cent. in excess of that of females, and in the cases of death by accident or negligence it was upwards of 80 per cent. in excess, though in this latter case the relation may be more accidental.

Since the cases of deaths by poisoning from accident or negligence are those which present the greater interest in connection with any question as to the public safety, it will be convenient to examine in the first place what are the articles that have been most frequently the cause of death in this way. As usual, the narcotic preparations occupy the most conspicuous place as having been the cause of the greatest number of deaths. They comprise opium, laudanum, morphia, soothing syrup, cordial, paregoric and chlorodyne, to which no less that 108 out of the total number of 343 deaths are ascribed. The class of substances which stands next in order, as having after narcotics been the cause of death in the greatest number of instances, comprises articles which are not for the most part poisons by Act of Parliament; such as the mineral acids—sulphuric, nitric and hydrochloric acids—and carbolic acid, which have been the cause of death in 38 cases. The more deadly poisons, such as strychnine, prussic acid, aconite, belladonna, cyanide of potassium, nux vomica, etc., taken altogether, are accountable for a very much smaller number of deaths, 16 in all. The remaining cases of poisoning under this head comprise 20 that are ascribed to alcohol, chloroform and chloral, 24 that are referred to chemical products such as caustic alkalies, phosphorus, bromide of potassium, and lucifer matches; 99 ascribed to arsenic, mercury, lead, copper and zinc; and 33 to miscellaneous articles, some of which are not described.

Among the cases of death by suicide from poison, the large number of 88, or 31·4 per cent. of the whole, is reported as having been caused by the mineral acids, carbolic acid and oxalic acid. Next in order comes the class of narcotic poisons, opium, laudanum, morphia, chlorodyne, paregoric, soothing syrup, etc., to which 53 cases of death are attributed. Of the remaining 139 cases, 49 are attributed to belladonna, prussic acid, oil of almonds, cyanide of potassium and aconite, 2 to chloroform, 20 to strychnine, nux vomica and vermin killers, and 43 to kinds of poison that have not been stated. In addition to these cases of death by poison three cases are recorded of murder of children under five years of age by poison, where narcotic preparations and a poisonous liniment were employed. These statistics will serve to show the direction in which legislation may be needful in regard to the sale of poisons.

THE CHEMISTRY OF THE CINCHONA ALKALOIDS.

The necessity of publishing the proceedings of the evening meeting unavoidably prevents the insertion this week of a paper received from Dr. Hesse, in which he points out some further defects of the chromate method suggested by Dr. de Vrij for the determination of quinine. In regard to this subject Dr. de Vrij has been unfortunate, for, though he may be admired for his chivalrous attachment to the herapathite method long after most chemists had ceased to trust it, there is reason to fear it was the means of leading him into error in some respects, before he eventually perceived the necessity of giving it up. This is especially the case in regard to the overlooking of cinchonidine that is to be expected with the herapathite method of determining quinine, as shown by Professor Flückiger's pupil Schimoyama. In some of the analyses published by Dr. de Vrij, there is a remarkable absence of any indication of cinchonidine. The enthusiasm with which he has also lately advocated the chromate method appears to have been somewhat premature, according to the observations of Dr. Hesse, and a further study of the chromates of cinchona alkaloids will be necessary before the method can be applied with certainty. This is clearly shown by the case of quinidine chromate, which decomposes under the influence of direct sunlight almost as rapidly as tinder would take fire in the focus of a burning glass. It appears, therefore, that Dr. de Vrij should not object to criticism in the manner he has done lately in a Dutch journal, but rather remember that in regard to this subject "there is much to be learned, which practice "only can teach ; and it is surely better for us all to "recognize this fact, and not allow such difference of "opinion as we may feel respecting a matter as yet "uncertain, to interfere with courteous communica-"tion of sentiment and co-operation as far as pos-"sible."

While writing of this subject we may refer to the recent communication by Dr. Hesse as to the nature of the crystals formed in a solution containing quinine and cinchonidine as one that has a very great interest. He regards these rhombic crystals not as cinchonidine, as was formerly supposed, but as a compound of that alkaloid with quinine, represented by the formula $C_{20}H_{24}N_2O_2 + 2C_{19}H_{22}N_2O$. The same fact appears to have been noticed by Mr. van der Sleen, who has also inferred the existence of other compounds of the two alkaloids simultaneously with Dr. Hesse.

It is certainly remarkable that the compound first described by Dr. Hesse appears to possess great tenacity of existence, and to maintain this character even in its saline combinations so as to seem almost to set a limit to the separation of quinine from cinchonidine, for Dr. Hesse has obtained a double sulphate in which the two alkaloids bear the same ratio to each other as in the above-mentioned compound. Though it is not very long since cinchonidine escaped from the protean condition in which it remained for several years, the observations of Dr. Hesse almost suggest the question whether we are really yet acquainted with cinchonidine and its salts, or only with compounds of which that alkaloid forms but a constituent part. In any case the question raised is an important one, and it will require to be examined with care and impartiality.

The conclusions arrived at by Dr. Hesse are based upon polariscope observations only, we believe, and although there is every reason to suppose that those observations have been made with the precision that usually characterizes his work, polariscope data are not quite so satisfactory as evidence in such a case as the actual separation of the alkaloids chemically. This appears to be the point that now calls for investigation in order to settle the question at issue satisfactorily. Evidently if Dr. Hesse's views are confirmed the determinations of cinchonidine sulphate on the basis of the crystals obtained from ether, such as those referred to by Dr. de Vrij last March,* will have to be reduced by at least one-third of their amount on that account alone.

From the Registrar-General's returns of the Births, Deaths and Marriages in England during the year 1885, which has just been issued, it appears that the deaths registered in that year, out of an estimated population of 27,499,041, numbered 522,750, and were in proportion of 19 persons to every 1000 living. With the exception of the death rate of 1881, which was 18·9 per 1000, this is the lowest that has yet been recorded, showing a continuation of a marked decline in the death rate, which commenced about the year 1860. The mean rate during this last quinquennial period, 1881-85, has been only 19·3 per 1000, and the maximum 19·6 per 1000, whilst the lowest death rate recorded in any year previously to this quinquennium was 20·3 per 1000.

* * *

The Junior Pharmacy Ball took place at Willis's Rooms on Wednesday evening last, and was, as heretofore, numerously attended. At supper the toast of the evening, "Success to the Junior Pharmacy Ball," was proposed by the President of the Pharmaceutical Society, Mr. M. Carteighe, who referred to the services of Mr. W. H. Kerr, the Honorary Secretary, in connection with the Ball. The President of the Chemists' Assistants' Association, Mr. Millhouse, responded to the toast. From the large attendance it seems certain that the Committee will have a handsome surplus available for the Benevolent Fund.

* * *

A meeting of the Chemical Society will be held on Thursday next, February 17, when papers will be read on "The Influence of Temperature on the Heat of Dissolution of Salts," by S. U. Pickering, and "Researches on the Laws of Substitution in the Naphthalene Series," by Dr. Armstrong.

* * *

The next meeting of the School of Pharmacy Students' Association will be held on Thursday, February 17, when Mr. W. H. Ince will read a paper on "Atoms," and Mr. F. J. C. Bird will give a report on Practical Pharmacy.

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At a meeting of the Chemists' Assistants' Association, to be held on Wednesday evening, the 16th inst., a paper on "Pharmaceutical Soaps," by C. Thompson, F.C.S., will be read.

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* See *Pharm. Journ.*, xvi., 784.

Transactions of the Pharmaceutical Society.

EVENING MEETING.

Wednesday, February 9, 1887.

MR. T. P. GOSTLING, VICE-PRESIDENT, IN THE CHAIR.

An Evening Meeting of the Society was held on Wednesday last, at 17, Bloomsbury Square. The chair was taken at eight o'clock by the Vice-President (Mr. T. P. Gostling). The proceedings commenced by the reading of a paper entitled :—

LABORATORY NOTES :—1. THE TESTS OF QUININE SULPHATE ; 2. DETERMINATION OF CAFFEINE ; 3. COCAINE HYDROCHLORATE.

BY DR. B. H. PAUL.

The paper is printed at p. 645, and gave rise to the following discussion :—

The VICE-PRESIDENT said it was very gratifying to hear Dr. Paul state that the test for sulphate of quinine given in the British Pharmacopœia was the best which could be adopted. The subject was a very important one to pharmacists, not only for their own satisfaction in dispensing pure articles, but in order that they might save themselves from frivolous prosecutions under the Sale of Food and Drugs Act.

Professor ATTFIELD said that what the meeting had heard that evening was of course extremely interesting, as being a *résumé* of the literature of the analytical work in connection with quinine, and no one was better qualified than Dr. Paul to give such a *résumé*. One was reminded anew in connection with the difficulties respecting the detection of one alkaloid in the presence of others, of the fact that one could never rely upon the solubilities of two substances, when they were mixed together in a particular menstruum, being the same as the solubility of each substance taken separately in the same menstruum. Throughout the whole of analytical chemistry, one met with difficulties occasioned by the non-recognition of that fact, not only in connection with alkaloids, but in connection with inorganic substances. It was well known that one could never depend upon what looked like promising processes for separating sulphide of arsenium from sulphide of antimony if reliance were placed upon the solubilities which applied to each of those substances separately. It was the same with regard to the allied alkaloids of cinchona bark. As to the addition of acid in the present Pharmacopœia test it was inserted by the highest authority. Nevertheless he could assure pharmacists generally, in respect to the suggestions made by Dr. Paul, that if he continued to have the honour of being reporter in connection with the production of a future pharmacopœia, no work of pharmacists should be passed over for the want of being brought before the proper authority. He was very glad to hear Dr. Paul speak of the highly advanced position of the present British Pharmacopœia as compared with those of other pharmacopœias.

Mr. WATSON WILL wished to ask Dr. Paul a question with respect to the alleged volatilization of caffeine. Dr. Paul stated that there was no loss of caffeine in roasting coffee. Roasters of coffee had stated that there was a considerable percentage of loss, and if printed authority was to be taken the loss was about 18 per cent. The usual yield was about 98 pounds of roasted coffee to 1 cwt. of berries. In his own experiments he had failed to detect any loss of caffeine in roasting.

Professor DUNSTAN said that the subject referred to by the last speaker was one of considerable importance. The statements on the subject had been extremely conflicting, but about seven years ago Bernheimer published the result of an investigation of the products of roasting coffee, and he showed that only about a quarter per cent. of the caffeine was present, and that the greater portion of the substance volatilized was palmitic acid, caffeol, which was a methyl derivative of saligenin, and other bodies. Several experiments were made, but in no case was the amount of caffeine volatilized found to be higher than one quarter per cent.

Mr. WATSON WILL asked Professor Dunstan whether Bernheimer's work was later than that of Tennik and König, who had recorded the volatilization of a higher percentage.

Professor DUNSTAN said that Bernheimer had summed up the previous experiments, which reported that larger amounts were volatilized.

Mr. WATSON WILL said that he believed that those statements were quite erroneous.

Professor ATTFIELD said that perhaps Dr. Paul would state in his reply the limits of the natural proportion of caffeine in coffee, and whether in the matter of limits it resembled the non-fatty material in milk, which was about 9·3 per cent., but was liable to vary to some extent, for which reason a lower limit was taken in testing samples of milk in connection with the Food and Drugs Act.

Mr. COLLIER said that Dr. Paul had mentioned that a portion of cocaine did not crystallize well as hydrochlorate. It had been asserted lately that cocaine possessed toxic properties. He had, however, known it used in solutions of considerable strength, but he had never come across any case of that kind. Nevertheless, he had been told by other persons that they had observed its toxic properties in their own practice. The cocaine which he had dispensed had always been well crystallized, and he had never observed any bad effects from its use. Perhaps the toxic effects might be due to the presence of some other body.

Mr. GRAVILL said that during the last few days he had made a collection of nine samples of hydrochlorate of cocaine from different sources. He had examined whether these samples contained any large percentage of amorphous cocaine. His experience, like that of Dr. Paul, had been that some of those samples which were crystallized gave indications of mere traces of amorphous alkaloid, whereas those that were simply granulated contained a considerable amount of amorphous alkaloid. One or two samples gave distinct indications of their hygroscopic nature. In particular one sample of cocaine contained, he should say, not less than 50 per cent. of amorphous alkaloid.

Mr. SEWARD said that from a dispenser's point of view he had a large quantity of cocaine passing through his hands. It was used principally in eye cases, and sometimes it was used for dental purposes. He had found that a 3 or 4 or 5 per cent. solution had to be freshly prepared when required, and that it could not be depended upon the day after it was made. He had been wondering whether the deterioration was due to a change from the crystalline to the amorphous condition. He had found that for dental operations the virtue of the cocaine seemed to be maintained longer, but yet after a few days fresh preparations had to be made. If the preparation used for eye cases was not sufficiently fresh it caused a purulent discharge. Within the last few days he had had a specimen which had a strong mousy smell; that was a granular preparation, but he had not had a chance of examining it. He had come to the meeting with some hope that he might get an explanation of that odour. He believed that Dr. Paul had said that the amorphous alkaloid had a similar smell. He should like Dr. Paul to tell him whether he might regard the smell in the granular preparation, to which he had alluded as being due to the presence of a large percentage of the amorphous alkaloid. Upon smelling the sample now exhibited by Dr. Paul he found that it had a smell of the same nature as the specimen to which he had alluded, but in his own specimen the smell was much stronger.

Dr. PAUL, in reply to Dr. Attfield, said that the figures representing the amount of caffeine in coffee varied from

1·2 to 1·3 per cent. in about 10 or 12 of the samples of coffee analysed. There was only one exception, in which the amount was 1·39 per cent. That was Liberian coffee. Strange to say, Liberian coffee appeared to show a higher percentage than any other kind. As to the loss of caffeine in roasting, he had made several experiments on small quantities, and these indicated that there was either no loss of caffeine by volatilization, or an exceedingly small loss. Statements as to such a loss had, however, been made positively and very circumstantially. Some years ago the writer of a paper published in the *Pharmaceutical Journal* proposed that the caffeine so volatilized should be collected by the coffee-roasters for the purpose of being utilized. A little reflection, however, would very soon satisfy one that the caffeine was not likely to be volatilized at the temperature applied in roasting, for it existed in the coffee berry in a non-volatile state in combination with caffetannic acid; and it was only when liberated from that state of combination that it could be volatilized, and that by heating it to a higher temperature than was applied in roasting coffee. With regard to cocaine, it was chiefly in consequence of Dr. Squibb's remarkable note in 'Ephemeris' that he had referred to the subject that evening. The samples shown happened to be accidental residues of some experiments on a large scale, and he had brought them for the sake of showing that both cocaine and its hydrochlorate could be obtained in a well crystallized form without any considerable waste of material. In this form it was entirely free from smell and colour, and presented itself in a form which appeared to be the proper one for its use in medicine. The other material with which it was associated was a gummy uncrystallizable alkaloid, which, when converted into hydrochlorate, made a still more objectionable hygroscopic salt; and he thought that it ought to be excluded from use in pharmacy. The smell referred to by some of the speakers was one highly characteristic of some samples of hydrochlorate, and it was always an indication of the presence of the uncrystallizable salt.

Coffee Husks and Catha Edulis.

Mr. Allen said he had been entrusted by Mr. Redhouse with two specimens. That gentleman had for many years resided in Turkey and other parts of the East, and he had continually evinced his desire to improve their knowledge of eastern materia medica. A short time ago Mr. Redhouse wrote to his friend the Consul at Jedda, with regard to coffee and another matter, and in reply he had received a letter from the Consul in which occurred the following passage:—

"I send you by this mail per sample post, a bag containing a small quantity of the dried 'gisher' or shell of the coffee berry, so largely consumed both here and in the Yemen for coffee. Also, by same means, a quantity of the dried 'quāt' so much chewed in the Yemen. This last has been forwarded to me by our Vice-Consul at Hodeidah, who says:—'In Yemen they always chew gāt green and fresh, but whenever they proceed to the Hedjaz for Haj, or go to some other place where gat is not obtainable, they do not fail to provide themselves with a quantity of the gāt herb previously dried. The Arabs of the Yemen never make nor have made a decoction from gāt to drink.'"

So far as he (Mr. Allen) could find there was no record of the coffee husks being used as a beverage. It was a singular thing that the Arabs should discard the seeds altogether, and use only the husks for drink. There was no aroma in the husks. He found that the "kat" had been described in an interesting paper by Mr. Hanbury, in the *Pharmaceutical Journal*, [1], xii., p. 269. The "kat" was really the *Catha edulis*. The top shoots were probably cut off in a fresh state and brought to the market. They were very eagerly bought by the natives, both rich and poor. The men went into the bazaars or exchanges, and drank water and energetically chewed the herb, and thus got into a pleasant state of exhilaration. It would be interesting to ascertain whether these leaves contained an alkaloid or glucoside. In most text-books it was stated that the *Catha edulis* was used for making a drinking decoction as well as for chewing, but in the consul's letter it was distinctly stated that the Arabs do not make a decoction from it. He had found in the text-books mention made of a coffee which was made from the external parts of the berry. This was called Sultan's coffee and was never imported into the West.

Poison Cabinet.

Mr. Abbott exhibited a model of a poison cabinet, which he said was of American invention. Its working was partly mechanical and partly electrical. The cabinet was so constructed that only one bottle could be out of place at one time, and the first bottle taken out must be restored to the shelf before another bottle could be removed. The invention, he said, had been recently perfected and patented in America.

Mr. Passmore asked wherein this cabinet differed from one brought forward by Mr. Young, of Warrington, at least fifteen years ago, and described in one of the early volumes of the present series of the *Pharmaceutical Journal*.* That appeared to be practically the same invention as the present cabinet.

Mr. Abbott said that he had not heard of the invention to which Mr. Passmore referred. American patents were not granted until the patent authorities had thoroughly investigated whether the invention had been in any degree anticipated, and if it had been so anticipated a patent was refused. He would make it his business to see whether the invention of fifteen years ago was similar to the present one. Of course, it was possible that this idea had been anticipated.

Specimens Exhibited.

Dr. Paul called attention to a sample of margosa oil recently brought to England from Bombay, and sent for examination by Mr. Charles Christy. It was remarkable for being exceedingly bitter. The oil was obtained from the seeds of the nim tree (*Azadirachta indica*) one of the drugs of the Indian Pharmacopœia, and was valued as an anthelmintic.

Mr. Holmes said that the remarks made by Mr. Allen suggested some important points. The physiological action of coffee undoubtedly differs from that of tea in several points, yet the value of these beverages is generally attributed to the caffeine they contain. He believed that the leaves of *Catha edulis* had been examined by Professor Schorlemmer, but he had not been able to procure a copy of his paper on the subject. He had been informed, however, that caffeine had not been found in the leaves, and the exhilarating properties of the leaves must therefore be due to some other principle. If this were the case with *Catha edulis*, the cause of the differences between coffee and tea appeared to him to be worthy of further investigation. With respect to the margosa oil, it possessed a remarkable alliaceous odour which he had not observed in the bark of the tree, specimens of which were in the collection of Hindoo materia medica in the Museum of the Society. In reference to the specimens which he had placed before the meeting, the tree trunks at the back were those of the cinchona tree, from Ceylon, principally *Cinchona officinalis*, *Cinchona succirubra* and a cinchona hybrid, apparently between the *C. officinalis* and *C. succirubra*. Some of the specimens showed that bark had been renewed by shaving it off instead of removing alternate strips. The large collection of bottles on the table contained specimens from the Cape of Good Hope Court of the late Colonial Exhibition. They represented the remedies used by the natives of the country, and by the colonists. Some possessed very little virtue, and others were used as substitutes for drugs used in this country. Among these were some castor oil seeds, the product of *Ricinus lividus*. These were smaller than the seeds usually met with

* *Pharm. Journ.*, [3], vol. i., p. 870.

in commerce. There were also specimens of gum arabic. The price of Soudan gum had lately risen considerably, and consequently gum had been sought for elsewhere. The gum usually imported from the Cape was the product of *Acacia horrida*, and yielded a weaker mucilage. A specimen of this gum was on the table. But recent importations from South Africa were of much better quality, and of these he was able, through the kindness of Messrs. Hale and Son, to place on the table four specimens which had been sold lately at prices varying from £8 10*s.* to £11 2*s.* per cwt. This gum might perhaps be the produce of the "kameel doorn" (*Acacia Giraffæ*), which was stated by Pappe to afford a good gum, but to grow beyond the limits of Cape Colony. In any case the product of the last-named tree was deserving of the attention of colonists. The Curator next referred to the root of *Rafnia amplexicaulis*, which was used as a substitute for liquorice, and then to dried bitter orange peel, which he remarked was usually prepared in the colonies in quarters instead of in strips, as preferred in this country, and sufficient care was not taken to dry it of good colour. The specimen of *Bubon Galbanum* was interesting on account of the name having been given to the plant by Linnæus on the supposition that it yielded the officinal galbanum. It, however, appeared to possess diuretic properties like celery. There were three specimens of bush tea, derived respectively from *Cyclopia genistoides*, *C. latifolia* and *C. Vogelii*. One or more of these were examined some time ago by Professor Church (*Chem. News*, xxii., 2), and subsequently by Mr. H. G. Greenish (*Pharm. Journ.*, [3], xi., 549, 569), but neither of these chemists had found any theine in it; yet the tea was used at the Cape as a cheap substitute for China tea, the usual price being 4*d.* to 6*d.* per lb. The leaves on being chewed were found to possess a pleasant tea-like flavour. Several of the native remedies used at the Cape of Good Hope appeared to be worthy of chemical and physiological investigation. Of these the following might be mentioned:—*Leonotis Leonuris*, which was stated to possess somewhat narcotic properties; *Melianthus major* and *Arctopus echinatus*, both highly valued in skin diseases. *Teucrium africanum*, which had an intensely bitter taste, was used as a tribal remedy for snake-bite, and appeared to possess antiseptic properties. *Lichtensteinia interrupta* appeared also to possess similar properties. *Toxicophlœa Thunbergii* and a few other plants had also been pointed out by Dr. Andrew Smith, of the Lovedale Mission, as worthy of investigation. Specimens of these plants were placed on the table. The Curator next directed attention to a series of eucalyptus and other essential oils received from the Royal Commissioner for the Queensland Court. Two of these, *E. citriodora* and *Backhousia citriodora*, closely resembled in odour oil of verbena, and several seemed capable of use in perfumery or the scented soap manufacture. The very fine collection of essential oils on the table, including many of extreme rarity, such as oil of myrrh, matico, pepper, etc., had been presented to the Museum by Messrs. Schimmel and Co., of Leipsic. This collection comprised altogether sixty specimens. The specimens of *Strophanthus hispidus* placed on the table included specimens of the pods and seeds of the two varieties now in commerce. The greenish-brown seeds were those at present in use. The white, more densely hairy, seeds were reputed to be still more poisonous and were not, he believed, employed at present. The specimen of an arrow poisoned by *Strophanthus* had been lent by Messrs. Burroughs and Wellcome. It would be observed that the poison, which was made to adhere by the use of the mucilaginous sap of a Tiliaceous tree, was placed immediately behind and not on the barb. The specimen of a fasciated stem of *Daphne Mezereum* had been sent by Mr. H. H. Pollard, of Ryde, in the hope that it might prove interesting to any students of botany who might be present. Three interesting specimens had been contributed by Mr. D. Kemp, of Bombay. One of these was the volatile oil of baphulli seed (*Pastinaca grandis*). Another was that of *Nardostachys Jatamansi*, which was supposed to be the spikenard of Scripture; it had in the undiluted state a disagreeable odour of valencen, but when diluted was somewhat pleasant. The third specimen was the essential oil of daroo wood, which was stated by Mr. Kemp to give a flavour like that of old rum to alcohol. The Curator believed this was the first time the oil had been shown in this country. The botanical source of the wood was not known at present.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council of this Society was held on Wednesday, February 2, in the rooms, No. 11, Harcourt Street, Dublin, at three o'clock.

The President (Mr. William N. Allen) in the chair.

The other members of the Council present were, the Vice-President (Mr. Draper), Dr. Evans, Mr. Ray, Mr. Grindley, Mr. Simpson, Mr. Wells, Mr. Beggs, Mr. Hayes, Mr. Hodgson, Dr. Collins and Professor Tichborne.

The Vice-President said he was obliged to speak for the President, who was suffering from sore throat. The father of their late President, Mr. Brunker, had just recently died at an advanced age; and he was sure that, under the circumstances, the absence of Mr. Brunker would be excused.

The Registrar, Mr. Ferrall, read a letter from Sir William Kaye, forwarding copies of two orders of the Privy Council of the 3rd ult., one approving of an amended regulation respecting examiners, adopted by the Council of the Society at a meeting on October 6, 1886; and the other directing that the reports of Dr. Duffey, the Visitor of the Examinations of the Society, shall in future be made annually, instead of quarterly, after the examinations.

The amended regulation respecting the examinations was as follows:—

> "That Regulation No. IV., Examiners, be amended so as to read:—'The Council shall elect fit and proper persons to be examiners—to conduct such examinations as are directed by Clause 21st, Pharmacy Act (Ireland), 1875, in each of the divisions of examinations, viz.:—I. Latin, English, Arithmetic, and Rudiments of Chemistry and Botany (this examination to be known as the Preliminary examination). II. Materia Medica and Botany. III. Pharmaceutical and General Chemistry. IV. Practical Pharmacy, Reading and Translating of Prescriptions, and the British Pharmacopœia.'"

Mr. Grindley: It is a pity that we cannot have Dr. Duffey's reports quarterly.

Mr. Hayes thought it was better that they should be made annually. A great many radical suggestions had been made by Dr. Duffey, and it was not desirable that changes should be made every quarter.

Mr. Simpson: He has made some very valuable remarks, and we have adopted a good many of his suggestions. If we had his reports quarterly they would be more beneficial.

The Vice-President: My opinion is that his reports are very valuable to the Society, and if they are preceded by such a long interval as a year, they will cease to have the same value that they would have if made quarterly. I can only express my regret that the authorities have seen fit to alter the period of publication from tri-monthly to annually.

Mr. Hodgson said that he and other members of the Council with whom he had spoken were of opinion that an annual report from Dr. Duffey would not be of much value. On the other hand, remarks and criticisms from

him at the end of three months would have weight and be adopted.

Mr. Wells: Would you propose that we should try to get an alteration of the period now fixed?

The Vice-President: No: with the simple expression of opinion that has been now given I think the matter may drop.

Mr. Hayes: They are following the precedent of the English Society.

The President: No, there is no definite time for reporting in the case of that Society. The Visitor reports when he wishes; sometimes not for two or three years.

A letter was read from Mr. Bremridge, the Secretary of the Pharmaceutical Society of Great Britain, returning thanks for a presentation of a copy of the Society's Calendar for 1887.

A letter was received from Mr. John Smith, enclosing certificates of having passed examinations (second class) held under the Science and Art Department in inorganic, theoretical and practical chemistry. The letter asked that these certificates should be accepted as qualifying the writer to present himself at the examinations for the licence.

Dr. Evans: This gentleman is an assistant of mine. I showed these papers to Professor Tichborne, and he recommended that they should be accepted by the Council.

The President: We do not know whether he attended three-fourths of the lectures of the course.

Dr. Evans: He informs me that that is the rule at those examinations, and that he did.

The President: Where did he pass the examinations?

Dr. Evans: I could not answer that.

Mr. Grindley said the Council only accepted certificates from the following schools:—The Caermichael College, the Cecilia Street School of Medicine, the Ledwich School of Medicine, the Queen's Colleges of Belfast, Cork and Galway, the College of Science, the College of Surgeons, and Trinity College.

The President: And the South Kensington Government School of Science.

Mr. Haynes: What we require is attendance at courses of practical chemistry. He says in his letter that he attended three-fourths of the lectures.

The President: But he does not say "at a school recognized by the Society." There is no school mentioned in the certificates, and no evidence that he was at the South Kensington Government School of Science. I think he ought to be asked if he was a pupil there.

Dr. Evans: I will find out all about it, and he will write to you.

The President: We do not want to prevent the gentleman from coming up. We only want to carry out our regulations.

On the motion of the President, seconded by Mr. Wells, the Registrar was directed to write to Mr. Smith, informing him that the certificates which he had sent in did not conform to the regulations of the Society.

The reports of the Preliminary and Licence examinations were submitted. The first showed that eight candidates had presented themselves, all of whom had passed, and the second showed that ten candidates had presented themselves, of whom the following passed:—Messrs. Joseph T. P. Buahagon, William S. Duggan, Frederick W. Hatton, George A. Henry, Patrick J. Lyons, John P. Timmon, and Thomas White.

On the motion of Mr. Wells, seconded by Mr. Grindley, the reports were adopted.

A report of the Examinations Improvement Committee came on for consideration. The first resolution contained in it was as follows:—

> "That the present system of marking has been adopted by the Council for the guidance of the examiners, but it is clearly understood that they shall have in conference and jointly a discretionary power to pass a candidate whose general information and intelligence appear to justify such a course, though he may not in some one subject have attained to the standard laid down."

Mr. Wells: Does that mean that if a candidate is very bad in any one branch the examiners will nevertheless have the power of passing him?

The Vice-President: What is intended is that a good all-round man may be passed although he may have been found fault with by some one examiner in one thing.

Mr. Hayes: If two examiners think he ought to pass will he pass?

The Vice-President: Certainly.

Mr. Hayes: I think the recommendation is a very fair one.

Mr. Wells: Would two examiners under that rule have the power of passing a man?

Dr. Collins: You may be sure that the three examiners will not pass a bad man. But if a candidate answers well in the generality of subjects, although he may not be quite up to the mark in some one thing, then it would be a right and proper thing that the examiners should consult together and see whether they could not pass him, even though he might be deficient by two or three marks. Although the Medical Council have no printed regulation of this kind I know they strongly advise that in the examinations held under their authority the examiners should consult.

The Vice-President: You may take it that the three examiners, on consultation, will be certain to arrive at a right conclusion.

Dr. Evans: I think it a dangerous thing for us to be interfering with our examiners. We get the best men we can for that office, and although we may let them know our wishes, we should take care not to dictate to them.

Mr. Wells: Must the three examiners agree to pass the candidate?

The Vice-President: Yes.

Mr. Hayes: It is better not to have a hard and fast line, but to leave the matter to the discretion of the examiners.

The recommendation of the report was then put from the chair, and unanimously agreed to.

The remaining matter for consideration was a recommendation of the report that the following draft of a letter to the Privy Council, containing observations on Dr. Duffey's report on the October examinations, should be adopted by the Council:—

"I am directed by the Council of the Pharmaceutical Society of Ireland to forward for the information of the Lord Lieutenant and Privy Council of Ireland the following observations on the Report of the Visitor on the Examinations of October, 1886:—

"As regards the Preliminary examinations, the chief point adverted to by your Visitor, viz.,—the disuse of the present chemical and botanical text-books, and the substitution for them of a general indication to the student of the range of subjects upon which he will be examined, had been already raised by the examiner himself, and although the alteration has not yet been made, a committee of the Council has the suggestion under consideration. To this Committee also will be referred the further suggestion that the examination should include elementary chemical physics.

"Passing to the examination for the Licence, although the Council does not interpret Regulation II. (Examiners) in the same way as does your Visitor, and does not consider a consultation of examiners as 'imperative,' it nevertheless feels, that in doubtful cases, such a consultation is desirable, and has (its view being shared by the examiners themselves) passed a resolution directing the adoption of this course. The Council is at the same time gratified to note the opinion of the Visitor that the system of marking which it has so carefully considered, and which is based upon that adopted by the English Society, 'tells in most cases in the interest of the candidate.'

"The Council is in entire accord with your Visitor in observing the deficient instruction in chemistry, and the evidences of excessive 'cramming' which are presented by many candidates for its licence, and feels that the only way in which these evils can at present be dealt with, and successfully met, is by keeping up at least to its present standard an examination which he defines as 'very properly searching and strict.' For even at the risk of reducing the number of candidates, it prefers that those who obtain through it the title of pharmaceutical chemist shall be something more than 'mere mechanical compounders and salesmen.' Its sense of the duties imposed upon it by the Pharmacy Act, and a regard for the public safety, supports it in this view.

"The Council entirely concurs with your Visitor as to the necessity of some alteration in the at present accepted arrangements for the attendance of students in its recognized laboratories, and, did its financial position permit, would willingly encourage and aid the formation of a School of Pharmacy in connection with the Society.

"In connection with this subject the Council regrets that the Royal College of Science is practically useless to candidates for the licence of the Society, in consequence of the laboratory not being open in the evenings.

"If arrangements could be made for giving evening instruction in that institution, the Council has no doubt that it would be largely availed of by pharmaceutical students."

The President said there were ten distinct points in Dr. Duffey's report, and the letter dealt with them all.

The draft letter was unanimously adopted.

Some financial business was then disposed of, and the Council adjourned.

Provincial Transactions.

TORQUAY CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held on Wednesday, the 26th ult., the President, Mr. E. Smith, F.C.S., in the chair.

The evening was devoted to the discussion of "Dispensing Difficulties," such as emulsions with a large quantity of saline matter, pill masses with an excess of liquids, and chemically incompatible mixtures.

The prescription that evoked the most discussion was the following:—

℞	Acidi carbolici	gr. xij.
	Sp. æth. nit.	℥j.
	Syr. aurantii	℥ij.
	Aquæ	ad ℥iij.

M. fiat mist. ℥ij ter in die.

It was dispensed with Calvert's No. 1 carbolic acid and neutral spirit of nitre. The mixture changed colour in the course of a few minutes, and at the end of two or three hours was of a brown colour with a black or dark brown deposit. It was found that this change resulted whatever precautions were adopted. In the course of discussion the theory was advanced that the change in colour was due to the formation of rosolic acid.

Votes of thanks to the Chairman and to the Secretary for his trouble in collecting the prescriptions closed the proceedings.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The seventh meeting of the ninth session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on the evening of Wednesday, January 26, at 9.15. In the absence of the President, the chair was taken by Mr. C. F. Henry, ex-President.

The minutes of the last meeting having been read and approved, the Chairman called upon Mr. A. Crichton Mitchell to deliver a lecture on "Some of the Relations between the Chemical and Physical Properties of Bodies," of which the following is a short abstract:—

Some of the Relations between the Chemical and Physical Properties of Bodies.

BY A. CRICHTON MITCHELL.

This title was chosen in order to give freedom, in the whole subjects of chemistry and physics, to take up any questions which might be of interest to the members as pharmacists.

The first question dealt with was that of *Surface-Tension*.—The action of molecular forces as exhibited in the superficial layer of liquids was explained. The principal characteristic of these forces is that they are only sensible at insensible distances. In liquids this surface-tension tends to reduce the superficies to the smallest possible under the assigned conditions. Several well-known phenomena were then alluded to as illustrating this principle, *e.g.*, the sphericity of raindrops, the process employed for the manufacture of small shot, and the phenomena presented by soap bubbles. An explanation was also given of the frothing of pharmaceutical infusions, and its removal by alcohol, and also of the action of oil in preventing waves from breaking into surf.

Solution.—In connection with solution the first matter taken up was that of supersaturated solutions, and it was shown that their continuance in the liquid state was due to absence of a certain condition, whose presence caused immediate crystallization; the necessary condition being the presence of a nucleus round which the crystallization might be started. Recent researches on the formation of fog, mist and rain were here touched upon.

The case of solution accompanied by change of temperature was next dealt with. It was shown how, in order that a solid should pass into the liquid state, energy had to be supplied to the system, and in the case of solution attended by a lowering in temperature this energy was obtained from the solvent in the form of heat.

This single example opened up the whole subject of thermochemistry, of which recently developed science a short sketch was then given. Its two postulates were the conservation of mass (otherwise known as the indestructibility of matter) and the conservation of energy. In the material system of which cognizance was here taken, there were two species of changes, (1) a change in the form and distribution of matter composing the system, and (2) a change in the form and distribution of the energy composing the system. The object being to measure definitely certain changes of energy, the material system experimented upon had to be started in a certain definite state; and had to be ultimately obtained in another certain definite state, and between these two, the change of energy of the system had to be measured. By the principle of the conservation of energy, it made no difference what path, so to speak, was pursued in passing from the one to the other.

Thermochemical notation, and the definitions of the unit of heat, the heat of solution, etc., were then explained; and some application of thermochemical principles closed the references to this question.

Refractive Index of Liquids.—In a homogeneous medium light travels in straight lines, but in passing from one medium to another of different density it undergoes refraction. For any liquid the value of n (obtained by dividing the sine of the angle of incidence by the sine of the angle of refraction) is constant; this quantity is termed the refractive index of the liquid. The molecular refractive power of any liquid was defined to be the value of $\frac{n-1}{d}P$, where n = refractive index, d = density, P = molecular weight. For isomeric bodies, the molecular refractive power is the same. This was instanced by the case of butyric acid and acetate of ethyl. Also, the molecular refractive power of a definite compound, and of a mixture of the same percentage composition, is the same. For if three molecules of methyl

alcohol and one molecule of amyl alcohol be mixed, a mixture is obtained which has the same percentage composition and the same molecular refractive power as ethyl alcohol.

In a homologous series, the refraction equivalent (*i.e.*, the value of the expression $P\frac{n^2-1}{d}$) increases by about 7·6 for each CH_2 added. With other series, the members of which differ by C, H_2, or O, it is found that the molecular refractive power increases equally for every C added; the same holds for H_2 and O. The actual members (mean values) are as follows:—

For each C added, the molecular refractive power increases 5·09.

For each H_2 added, the molecular refractive power increases 2·4.

For each O added, the molecular refractive power increases 2·85.

The lecture was illustrated by experiments, of a simple yet appropriate nature, on surface tension, solution, etc.

On the motion of the Chairman, seconded by the President, a hearty vote of thanks was awarded to Mr. Mitchell.

Some queries were then read by the Secretary, and it was agreed to hold them over till next meeting.

The meeting was then closed.

LIVERPOOL CHEMISTS' ASSOCIATION.

The seventh general meeting of the thirty-eighth session was held at the Royal Institution on Thursday evening the 3rd inst. The President, Mr. A. C. Abraham, F.C.S., in the chair.

The notes of the previous meeting were read and confirmed, and the following donations announced:—Current numbers of the *Pharmaceutical Journal*, from the Society; *Canadian Pharmaceutical Journal*, from the publisher; *British and Colonial Druggist*, from the publishers; *Pharmaceutical Record* of New York, from the publishers; 'The Ephemeris,' vol. iii., No. 1, from Dr. Squibb, Brooklyn; 'Proceedings of the American Pharmaceutical Association, 1886,' from the Association; 'General Index to the Year-Book of Pharmacy,' 1864 to 1885, from the Conference.

A vote of thanks was unanimously accorded to the respective donors; and the President then called upon the Honorary Secretary to read Mr. Norman Tate's paper on "Salol," Mr. Tate being unavoidably absent. In this paper the author referred briefly to the introduction of salol by Professor Nencke about three years ago and to the therapeutic study of it by Dr. Sahli (see *Pharm. Journ.*, [3], xvi., 1005; xvii., 273, 507, 527, etc.), who obtained results showing that the compound possesses very valuable antirheumatic, antipyretic, and antiseptic properties. The author stated that some experiments he had made and others he was still continuing indicated that salol is very efficient as an antiseptic, and much superior in this respect to salicylic acid and the salicylates. Its use had been suggested for impregnating bandages and wool intended for surgical dressings, as it adheres more readily than salicylic acid. Mr. Tate then referred to the methods for preparing salol which have been described in this journal recently (see before, pp. 507, 527,).

At the close a short discussion followed, and a vote of thanks to Mr. Tate was proposed by Mr. A. C. Abraham, seconded by Mr. J. S. Ward, and carried unanimously.

The President then read a note on "Tincture of Strophanus."

At the close a discussion followed, and a vote of thanks, proposed by Mr. E. Davies, and seconded by Mr. W. Wellings, was unanimously accorded to the President for his paper.

MANCHESTER PHARMACY STUDENTS' ASSOCIATION.

The third meeting of the above Association was held in the Pharmaceutical Laboratory, Owens College, on January 25.

The minutes of the previous meeting having been read and confirmed, Mr. W. Spencer Turner proceeded to give an interesting paper on "The Botany of Shade Hill Market."

Mr. Turner's paper may be condensed thus:—He pointed out the great use of such places as Shade Hill Market to students who are not able to get to the country for flowers, etc., to dissect. He stated that the year's "flora" of Shade Hill included not less than about 250 species, including about 150 English wild flowers, representing 46 natural orders. The English flora* consists of 93 orders, *i.e.*, 73 exogens, 15 endogens and 5 conspicuous cryptogams, and, of course, in selecting flowers for sale, those with some marked character of appearance or popularity are first chosen, so that a collection obtained from a market only includes specimens of scientific interest when they happen, also, to be popular. The abundance of the supply during the later spring, summer and autumn months makes common flowers very cheap. Daffodils, wallflowers, etc., appearing by cratefuls, and flowers mixed and arranged in bunches for sale are exposed in hampers, and the display seen in the early morning is worth getting up at six o'clock to see, and 2*s.* 6*d.*, well spent, will provide subjects for many an hour's work. Mr. Turner concluded by distributing and explaining the structure of some flowers he had bought that day, such as hyacinths, wallflowers, violets, spiræa, cauliflower, Christmas roses, Brussels sprouts and banana. He also exhibited some mounted wild flowers.

At the close of the evening a numerous collection of drugs from the Indian and Colonial Exhibition was shown, upon many of which Mr. William Elborne made comments.

The next meeting will be held on February 24.

Proceedings of Societies in London.

ROYAL INSTITUTION OF GREAT BRITAIN.

Suspended Crystallization.†

BY PROFESSOR JOHN MILLAR THOMSON, F.C.S.

(*Concluded from page* 603.)

The following table gives the results of many experiments on the action of isomorphous and also of dissimilar substances on supersaturated solutions of each other:—

Isomorphous Sulphates on Magnesium Sulphate.

Substance in solution.	Substance added.	Result	Remarks.
$MgSO_4.7H_2O$	$ZnSO_4.7H_2O$	Active	Crystallization induced at once, the crystals forming long needles.
,,	$NiSO_4.7H_2O$	,,	
,,	$CoSO_4.7H_2O$	,,	Crystallization induced after some time, the crystals forming attached to the nucleus.
,,	$FeSO_4.7H_2O$	,,	
,,	$MgSO_4.7H_2O$	,,	
,,	$NiSO_4.6H_2O$	,,	Crystallization induced after some time, the crystals attached to the nucleus generally being truncated needles.
,,	$FeSO_4.xH_2O$	,,	
,,	$CoSO_4.xH_2O$	,,	

* As given in 'Lond. Cat. Brit. Plants.'

† Read, Friday, May 14, 1886.

Dissimilar Bodies on Magnesium Sulphate.

Substance in solution.	Substance added.	Result.	Remarks.
$MgSO_4.7H_2O$ . .	$MgK_2(SO_4)_2.6H_2O$	Inactive	
,, . .	$Na_2SO_4.10H_2O$	,,	
,, . .	$Na_2S_2O_3.5H_2O$	,,	
,, . .	NaCl	,,	
,, . .	Glass	,,	

Isomorphous Salts on Sodium Sulphate.

$Na_2SO_4.10H_2O$.	$Na_2SeO_4.10H_2O$	Active	Crystallization immediate.
,, .	$Na_2CrO_4.10H_2O$	,,	Crystallization immediate.

Dissimilar Bodies on Sodium Sulphate.

$Na_2SO_4.10H_2O$.	$MgSO_4.7H_2O$	Inactive	
,, .	Na_2SeO_4	,,	
,, .	$Na_2S_2O_3.5H_2O$	,,	
,, .	$Na_2HPO_4.10H_2O$	,,	
,, .	KCl	,,	
,, .	NaCl	,,	
,, .	$KClO_3$	,,	
,, .	$NaI.4H_2O$	,,	
,, .	Glass	,,	

Chrome Alum and Iron Alum on Common Alum.

$AlK(SO_4)_2.12H_2O$	$CrK(SO_4)_2.12H_2O$	Active	The chrome alum solution was prepared by saturating at 70°, and then allowing it to crystallize in the bulb tube.
,,	$FeK(SO_4)_2.12H_2O$	,,	

Bodies of the same form or belonging to the same system, but not similarly constituted on Alum,

$AlK(SO_4)_2.12H_2O$	NaCl (cubes)	Inactive	
,,	FeS_2 (cubes)	,,	
,,	Fe_3O_4 (octahedra)	,,	

Hydro-disodic Phosphate and Hydro-disodic Arsenate.

$Na_2HPO_4.12H_2O$	$Na_2HAsO_4.12H_2O$	Active	Crystallization immediate and very rapid.

When two salts that are not isomorphous are in a supersaturated solution together a separation of one or other of the salts may be effected within certain limits. Thus in a mixture of sodium sulphate and nickel sulphate, the former may be crystallized by touching with a crystal of the salt, and in allowing the mixture to remain at rest for a few minutes the liquor containing the nickel sulphate may be entirely poured off from the crystals of sodium sulphate.

A similar phenomenon may be seen by preparing in a long glass cylinder two supersaturated solutions one above the other, the lower one being sodium thiosulphate dissolved in its water of crystallization, the upper one sodium acetate dissolved in a quarter its weight of water. When the whole has cooled down under a stopper of cotton wool a crystal of sodium thiosulphate may be introduced; this will pass through the acetate solution without solidifying it, but will cause the immediate solidification of the thiosulphate solution.

The following phenomena may be seen in experiments carried out on mixtures of dissimilar salts.

A. When the mixture consists of two salts which are not isomorphous.

(1) Sudden crystallization may take place, gradually spreading through the solution on the addition of a nucleus, causing a deposition of the body belonging to the nucleus only.

(2) That when sudden crystallization takes place, causing the deposition of both salts, there is a preponderance of the salt of the same nature as the nucleus.

(3) That the nucleus may remain growing slowly in the solution, becoming increased by a deposition of the salt of the same nature as the nucleus.

B. When the mixture consists of two isomorphous salts.

(1) Sudden crystallization may appear, giving a deposition of both salts, apparently in the proportions in which they exist in solution.

(2) That when slow crystallization takes place, the nucleus increases by a deposition of the least soluble salt, showing that in mixed supersaturated solutions a gradation of phenomena may be experienced, passing from those shown in the crystallization of a true supersaturated solution to those shown in the crystallization of an ordinary saturated solution.

Passing from the action of nuclei on supersaturated solutions of mixtures of dissimilar salts, it is interesting to examine the action of the different constituents on supersaturated solutions of double salts. The following table gives the results of certain experiments with such double salts.

Substance in solution.	Nucleus added.	Result.
$HgCl_2(NH_4Cl)_2,3H_2O$.	$HgCl_2$ (prismatic)	Active.
,,	$HgCl_2$ (deposited from hot solution).	Both active and inactive.
,,	NH_4Cl	Inactive.
$HgBr_2(NH_4Br)_2,3H_2O$	$HgBr_2$ (deposited in the cold).	Active.
,,	$HgBr_2$ (deposited from hot solution).	Both active and inactive.
,,	$(NH_4)Br$	Inactive.
$HgI_2(KI)_2$	HgI_2 (needle-shaped crystals).	Active.
,,	KI	,,
$AlK(SO_4)_2,12H_2O$ . .	$Al_23(SO_4),18H_2O$	,,
,,	K_2SO_4	,,
$NaNH_4HAsO_4.4H_2O$	$Na_2HAsO_4,12H_2O$	,,
,,	$(NH_4)_2HAsO_4,Aq_2$	,,

From these experiments it will be seen that in the case of the double salts formed by the halogen acids, certain of the component salts are capable of inducing crystallization, but in the case of the salts formed from acids of higher basicity the component salts are incapable of causing that particular disruption of the solution.

Having now treated this question experimentally, it may be of advantage to examine it shortly from a theoretical point of view to see if any explanation may be offered at least with our present knowledge of the sudden changes from liquid to solid.

At the present time it would be rash to attempt a complete answer to the questions—

(*a*) What fully takes place when a salt dissolves.

(*b*) Why some salts always separate out when their hot solutions are cooled: and conversely why certain ones remain dissolved under the same conditions.

In order that a salt may dissolve in water we must suppose some attraction between the molecules of the salt undergoing solution, and the molecules of the water. With most salts, the power of the water to dissolve them is increased with rise of temperature, and this rise in temperature means increase in the active movement of the water and the salt molecules, and therefore greater

facility for them to come near enough to one another for their mutual attractions to be exerted.

Then why do not all salts dissolve more in hot than in cold water? all do not do so, as you have seen in my diagram during lecture. This leads us to following up the completion of this attraction, namely, the combination of the water and the salt molecules which I have alluded to in my lecture under the term hydration.

We must suppose that some hydrates exist at a higher temperature than others, and this is borne out by experiment. In the case of salts whose hydrates exists only at the lower temperatures, the effect of raising the temperature would be merely to increase the vibratory movements, and so shake asunder the water and salt molecules, the dehydrated salt naturally separating out, and, therefore, we could not expect more to go into solution by merely heating the liquid.

With regard to the second point. We must remember that there exists a strong attraction between the individual molecules which compose the salt. Taking, then, the case of a salt like potassium chlorate, which in the solid state contains no water attached to it. We dissolve it in hot water, and on cooling, much of the salt separates out. We can suppose that the attraction of the water for the salt and the active movement produced by the rise in temperature overcome this attraction of salt molecule for salt molecule, but as the solution cools, this exercises its full force, and crystallization ensues.

Now, taking the instances where the salt remains in solution even after cooling, but in much larger quantities than can be obtained by treating the solid salt with water at that temperature; this being what I have called "suspended crystallization."

Let us consider the case of sodium sulphate as perhaps the most familiar instance. You have seen a large volume of that salt suddenly solidify on the introduction of the proper nucleus. Now why did not that salt behave like the potassium chlorate instead of remaining in solution in the liquid after cooling?

It has been suggested that this *super*-saturated solution is merely a saturated solution of the anhydrous salt. That may or may not be so. If it be the case, we can suppose that the molecules of the salt and water are prevented from arranging themselves in their normal order and proportions, and so there is a kind of strain throughout the liquid. This can only be overcome by something which will disturb the molecules sufficiently to bring about the necessary rearrangement.

Taking the instance of the suspended solidification of water cooled below its freezing point; we know that only the disruptive effect of shaking is required; but with sodium sulphate in water and many others, no amount of shaking, as we have seen, is sufficient. Some stronger force is required; this stronger force is found so far as we know at present only in the attraction for the salt of the body itself, or of some substance having the same crystalline form and a similar chemical composition, as has been already shown.

I say advisedly at present, because in my opinion it has not yet been conclusively proved that no form of what we should call simply mechanical disturbance may not bring about sudden crystallization in these so-called supersaturated solutions. Indeed, there is an interesting experiment which seems to foreshadow such a possibility. By dropping a single carefully washed crystal of alum into a supersaturated solution of that salt, we notice a very interesting phenomenon. The whole surface of the solution is covered with small crystals separated by definite and considerable intervals, and it appears as if the mere mechanical disturbance produced by the first crystal attracting to itself similar molecules had caused the union of other molecules to form crystals in the remoter parts of the liquid. This is, I think, a very interesting case, which if studied with other similar instances may throw additional light on the causes of such crystallization. If we suppose that the salt exists in solution as a hydrate, that is, in actual combination with water, we can imagine that each individual molecule of the hydrate attracts each other one, and is attracted by it equally; so if one molecule were to move towards another, it would be restrained by its neighbour, and that in its turn by those near it, and so a state of equilibrium would come about. But, whatever may be the condition of the salt in solution, the same cause, namely, the attraction of similar molecules, appears always to render the equilibrium unstable.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, February 3, Mr. E. White occupying the chair.

A paper on the Quality and Purity of Commercial Specimens of Cacao Butter, by Mr. E. H. Barritt, was read by the Secretary.

The author first enumerated and described the various tests that had been proposed by different authorities for the detection of adulterations in ol. theobromæ, and then gave the results of his examination of eight trade samples. These gave melting points varying from 30° to 34° C., and specific gravities ranging from 0·874 to 0·921, while the taste and Ramsperger's ether solubility test pointed to impurity in two of the specimens, and possibly a third, the remaining five being very satisfactory.

The paper was followed by a discussion, in which the Chairman, Secretary, Messrs. Braithwaite, Eastes, Bird, and Beach took part.

The Reporter on Analytical Chemistry, Mr. J. G. Tingle, then read a report on "Some Recently Suggested Analytical Methods," describing:—1, a method of detecting corrosive sublimate in calomel by means of soap, guaiacum and ether; 2, a method of standardizing solutions of iodine by saturating with H_2S and titrating the HI produced with decinormal alkali, using methyl orange as indicator; 3, a test for small quantities of hydrocyanic acid; 4, a method of separating Mn, Co, Ni, and Zn from Fe by K_4FeCy_6 in ammoniacal solution with tartaric acid; 5, tests for the purity of olive oil; 6, methods of separating various metals by means of oxalic acid.

The report gave rise to a discussion, in which the Chairman, Messrs. Bird, Short and Eastes joined.

After a short discussion on the applicability of methyl orange as an indicator of neutrality in the preparation of the strong solution of acetate of ammonium, the meeting adjourned.

Review.

CHEMICAL LECTURE NOTES, taken from Professor Curtman's Lectures at the St. Louis College of Pharmacy. By H. M. WHELPLEY, Ph.G., Quiz Master of Chemistry and Pharmacognosy in the St. Louis College of Pharmacy.*

This work seems to have been intended by the author for the use of students in pharmaceutical and medical colleges, but its utility for that purpose seems rather questionable; certainly, it could only be found useful to students when read in conjunction with some other manual containing much fuller detail and explanation; it seems, in fact, more suitable as a remembrancer than for any other purpose.

It consists of a compilation of facts, and, in many cases, of mere headings suggestive of facts, such as would be used by a lecturer to refresh his memory and suggest the subjects to be explained in his lectures, being, in fact, a full syllabus of Professor Curtman's lectures, slightly enlarged, and illustrated by figures and diagrams.

To a student who has already attended courses of

* St. Louis, Mo. H. M. Whelpley. Small 8vo. Pp. i–iv., 1–143.

lectures on the subjects herein treated of, the work would prove very handy in reminding him of the facts, etc., he had learnt; but to the student actually attending lectures it would be calculated to prove a temptation to omit taking notes for himself, and no ready-made book of notes, however good it may be, can be of such use as personally taking notes during the lecture, and afterwards transcribing them in a neat and systematic manner.

The first half of the book treats of chemical physics, and embraces a large number of facts, which are, in many cases, pictorially illustrated, but which are crowded together without any explanatory matter, so that a great proportion of them would be unintelligible to a student without a supplementary explanation. The general properties of matter, absolute and specific gravity, pneumatics, hydrostatics, cohesion, adhesion, heat, light, electricity and magnetism form the subjects of this part of the book. The second half is devoted to inorganic chemistry, treating only of the non-metallic elements; one or two organic substances, such as ethylene and acetylene, are also included. This portion also contains plenty of facts, but, as in the first part, there is the same want of connective and explanatory matter; in fact, it exactly resembles an ordinary note-book where facts and headings of subjects are jotted down in the most condensed form possible. As notes for lecturing from they would be admirable, and they are also well adapted for reference, as they contain a large number of data not generally found, such as tables of indexes of refraction, relative conductivity for heat and electricity, boiling points at increased and diminished pressure, etc., etc. But the advisability of a student attempting to store his mind with so many isolated facts, rather than with more general principles, is very questionable.

Correspondence.

**** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Future of Pharmacy.

Sir,—In the Journal of January 29 there appear some letters by Sheffield fathers in pharmacy, opposing your ideas as expressed in the "leader" of January 22.

Mr. Cubley commences by asserting that the Pharmaceutical Society has hitherto been supposed to have for its special object "the care of the public safety." Now it ought to be patent to everyone who can reason from facts, that no one can care for the public safety so well as the public itself. The public takes good care to look after itself; and any assumption of this responsibility by a Society, whilst evidencing a most sublime conceit, tends to interfere with the working of the natural causes which have slowly developed existing social conditions and made individuals, on an average, fitted to their present surroundings. In so far as care for self-preservation is delegated to others, just in equal degree will the individual lose the power of looking after himself. As I take it, the Society is but a superior kind of trades union, formed for the protection of its members in cases where they are unable to protect themselves, with the additional functions of striving to promote their culture and improve their status. Mr. Cubley then makes much of the case of inside competition—the deficient tincture of opium. Overlooking the doubt as to whether the State has any real right to confer a monopoly of the sale of poisons upon any class, whatever its qualifications, I think we may safely apply the rule of the "survival of the fittest" in this instance, and ask, "Is the vendor of diluted tinctures usually one of our high-class pharmacists, or is he not rather one who has a hard struggle to make all ends meet, and does his business appear to prosper in an increased ratio as compared with that of the other or not?" Replies to these questions should suffice to allay any unworthy fears as to the possibility of ignorance and selfishness triumphing over knowledge and duty.

As regards legislation, I feel, sir, that your standpoint is the right one, and that every individual pharmacist must be a law to himself. Until this is the rule, and everyone performs the miscellaneous details of his business in certain ways because it is right that they should be so done, apart from any considerations of law, we cannot expect to see anything like ideal pharmacy. Corrupt members cannot, when joined together, make a perfect body, and I fear much that many of our shining lights look more to the "main chance" than to the justice of all their acts. The outcries against "Food and Drugs Act" prosecutions would be fewer if all were conscious that everything they sold had answered the proper tests when applied by themselves. Carelessness, no less than dishonesty, is deserving of punishment in such cases as these, and a discerning public will see to it that worth is rewarded.

I would protest against Mr. Cubley's reference to the "younger members" as representing the ideas of any but a self-seeking few. I, a student, on behalf of true students generally, refuse to recognize such as being of us, and object to their foolish exclamations being made use of to further the aims of those who would burden us with more legislation, and so interfere with our liberty of action in the future.

With regard to Mr. Ward's contribution, in so far as he opposes your arguments, I think he is most decidedly wrong, and the future progress of pharmacy will be much checked if the judgment of the majority of those practising the are is so biassed that they fail to see the firmness of your position. One would have thought that to a local secretary it would certainly be of the very least importance what other traders might sell under the names of medicinal preparations, and that he, conscious of the superiority of those which he supplied, all made strictly according to his beloved B.P. (with all its synonyms) and agreeing with its tests in every respect, could afford to live down such mean opposition. Anyhow, "protection" in trade is altogether out of date, and those who fear wholesome competition had better stand aside and make room for others who, relying upon the knowledge that their wares are of the best, and that they always give honest value, can hold their own against all comers. As to paregoric *minus* opium, if the public desires such, it will have it in spite of all the Council meetings in the world, with their prosy and doubtfully worded resolutions. It is simply a question of "supply and demand," which legislation cannot influence.

I doubt whether the stipendiary would feel badly crushed by Mr. Ward's *naïve* criticism of his decision, or whether the poorer classes would be altogether overwhelmed by his pathetic appeal on their behalf, coupled with the cry for "synonyms." Can he really vouch, from personal knowledge, that when members of these classes visit qualified pharmacists, they are treated with due consideration and always receive articles of the quality demanded? Do they get "simple justice?" Or is it not a fact that many presumably intelligent and scientific members of our "profession" stoop to the mean practice of diluting for the sake of extra profit, and that the "poorer classes" suffer most by the fraud? I know it to be but too true that pharmacists are not invariably honest and straightforward in their dealings with the public, and until they find "salvation" in this respect, and are less influenced by the desire for pecuniary profit, we need not look for much genuine advancement.

To sum up, it ought to be clearly seen that legislation is useless to depend upon, and that the Pharmaceutical Society cannot work good if its members persist in evil. Education too, with or without "curriculum," will fail to raise our position socially if ethical considerations are ignored. Information honestly acquired and applied, joined with an ever-prevailing sense of justice, will effect the desired results. Anything short of this will not avail, for "miracles do not happen."

Sheffield. A Sheffield Student.

The Proposed Legislation.

Sir,—It was with much regret I read in the *Pharmaceutical Journal* of February 5, that our Council had determined to approach Parliament on the curriculum scheme. If I remember right, the Visitor on behalf of the Privy Council reported that the present Minor exam-

nation was sufficient for the safety of the public. In the face of this I do not see why the Council should proceed with the contemplated Bill, which, in my opinion, will prove of no service in mitigating the evils from which we are suffering. If it intends legislation at all, and there is great need for this, let it frame a Bill for restricting dispensing and the sale of poisons to chemists and amending the clause which enables corporate bodies to dispense and carry on the business of a chemist. A measure of this kind would have the goodwill of our profession; but I am inclined to think a majority of chemists will be against the proposed curriculum legislation, and as our Council should represent our views, I should suggest that a vote be taken amongst all chemists, and let the issue determine the future action in the matter. MAJOR.

OILMEN AND THE SALE OF POISONS.

Sir,—As a young member of the Pharmaceutical Society, I was pleased to see a letter from Mr. Cocker in the issue for January 22, calling attention to the utter carelessness of oilmen in the supply of dangerous liquids like oil of vitriol, etc. The case cited by Mr. Cocker is an everyday one in many districts, and I think there should be a remedy for such things. Why should one who has no qualification be allowed to endanger lives in this way? I was very pleased to see that Mr. Cocker very properly remonstrated, and explained the danger to the person and labelled the bottle; but I think he might have improved his procedure by first removing the old nitre label before putting his oil of vitriol and poison label on: for supposing his label came off in one piece (as they will do often if too much liquid is used for sticking, and which is not squeezed out well), then if any accident occurred, reference would at once be made by some wise coroner to the unfortunate brother chemist whose name was on the nitre label.

This sticking one label over the other is a disgrace to chemists; for it is very general. I have taken off one bottle as many as seven labels, one on top of another. I think chemists will do well to at once discontinue this habit which is manifestly unfair to their brother chemists, and is certainly unworthy of one bearing a name that wants raising in the estimation of the general public, and not lowering, as such acts must assuredly bring about.

Bromley, Kent. WILLIAM BAXTER, JUN., M.P.S.

PHARMACY AND CO-OPERATIVE STORES.

Sir,—I enclose an extract cut from a trade journal, which speaks for itself.

"The Pharmacy Board of Victoria have, on appeal to the Supreme Court, established the principle that companies there cannot carry on the business of pharmacy."

That is what I term practical legislation on behalf of pharmacists, and if that principle can be established in Victoria, surely the same can be done here in England. Practical help of this kind will do more for the interests of the Pharmaceutical Society and for chemists than all the talk about the necessity for advanced knowledge, and the consequent stringency of the examinations. I do not object to the increase in the curriculum, for the greater the advance in that direction the better for the profession and for the general public; but I feel confident that, until more help and protection are given to their interests by the Society, chemists will not do more than they are compelled in the way of examination.

Weymouth. R. ELWELL NAISH.

THE DISPENSING OF ERGOT.

Sir,—Will you kindly inform me if I was justified in refusing to supply extract of ergot under the following circumstance?—

"Liquid Extract of Ergot ½ an ounce.

"—— ——, L.R.C.P. & M.R.C.S.

"*Urgent.*"

The above was written on a card (not the medical man's). Not knowing the bearer, the doctor or the doctor's signature, I refused to serve it and was threatened by the bearer of the card with legal proceedings should anything occur to the patient; if it cost a thousand pounds to get me convicted, he would.

I did not serve the extract until a prescription was written. I was then told by the medical man, if anything happened to his patient he should hold me responsible.

Now, sir, was I to blame or the doctor? Should the medical man not have written a prescription, or have sent an order written on his own card in the first place?

If retailers of scheduled poisons are to be held responsible for the lives of doctor's patients, when simply carrying out the meaning of the Poison Act, the sooner it is known the better.

374, *Old Kent Road.* ALBERT PELLEW.

"PEPSIN AND PROPEPSIN."

Sir,—I should like, if you will permit me, to endorse from experience the result of experiments by Dr. Podwissotzky on the formation of pepsin, as noticed in "The Month."

Some time since, when experimenting on the exhaustion of pigs' stomachs by means of glycerine and hydrochloric acid, it was noticed that when the same stomachs were subjected to two successive macerations with different lots of the same menstruum, the solution which resulted from the second maceration was much more active than that from the first; quite the opposite of what might be expected were the pepsin all present as pepsin in the fresh stomach.

In my paper published in the Journal of December 18, I fear this reason supports Liebig's theory of the formation of pepsin by the destruction of epithelium, thinking that this destruction went on with certain limits showing the maceration process. Dr. Podwissotzky's theory, however, seems to fit the facts without appealing so much to the imagination.

Apart from its physiological interest, the commercial bearing of this fact must be obvious, and, therefore, the thanks of your readers are due to you for calling attention to it.

74, Market Place, Sheffield. G. A. GRIERSON.

CERA ALB. AND CERA FLAV.

Sir,—In a note upon the above subject appearing in your issue of December 11, 1886, p. 481, certain melting points are given on my authority, as showing that white wax can be obtained commercially having a melting point intermediate between that of authentic samples of yellow.

It was unfortunate that I should have given definite figures under the circumstances, as I had been compelled to use a thermometer of which I expressed a doubt, and which I now find to have been high. The correct temperatures at which transparency is reached in my samples should be—2 at 143°; 2 at 144°; 1 at 145°; 2 at 146°; commercial white (pure) at 144°; Californian at 147°.

The last was prepared by myself many years ago from honeycomb, I believe long before the artificial manufacture of comb was begun. It is now practically white.

I trust you will find room for the correction.

Liverpool. A. C. ABRAHAM.

W. H. J.—The Local Secretary for Bristol is Mr. J. Stroud, Chesterfield House, Ashley Hill.

W. J. C.—The yellow coloration is due to a slight acidity of the benzoated lard, which in the new B.P. is provided for by the addition of some potassium carbcnate.

Linimentum Terebinthinæ.—We have received several letters on the subject of this preparation, but pending an authoritative declaration as to what its character should be, we do not think any useful purpose will be served by their publication.

F. E. Sturmfels.—We are unable to comply with your request, except in the portion of the Journal devoted to advertisements.

Chemicus.—The solubility of quinine salicylate is 1 in 330.

Ellis Jones.—The precipitate referred to by Mr. Macdonald was most likely caused by an excess of phosphoric acid.

F. W. Sandy.—The result was probably due to the formation of phosphate of iron, resulting from excess of phosphoric acid.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Howie, Hesse, T. Frost, Thompson, Gilmour, Pattison, Verax.

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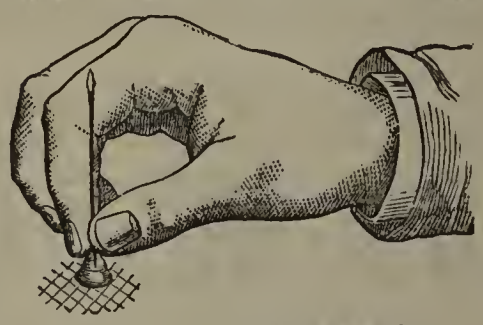

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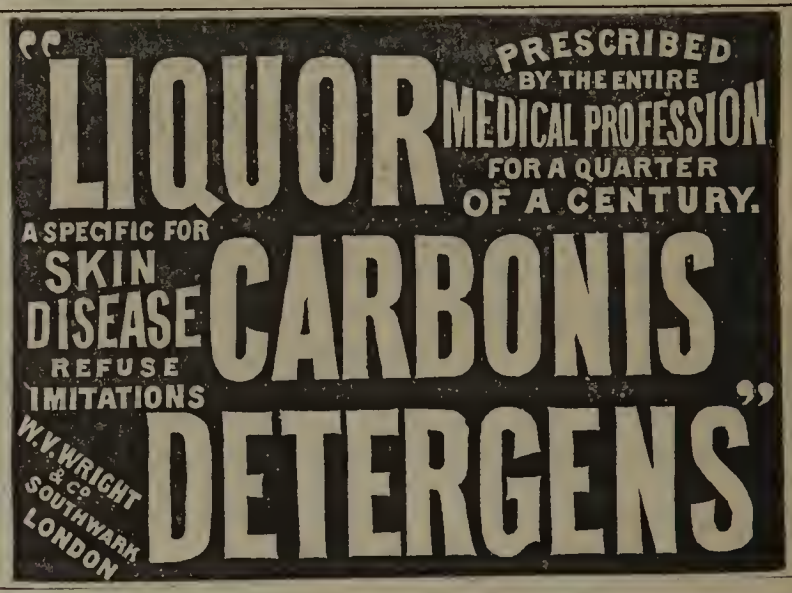

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Ditto ditto 1 lb. 10 oz., 4/6 ,,					
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Include an extensive and lofty LECTURE HALL to seat 130 Students; two smaller CLASS ROOMS; well fitted DISPENSARY; a MUSEUM of Chemical and Materia Medica specimens; two LABORATORIES, the larger containing 74 separate benches, each bench being fitted with gas, water and waste pipe. The gas burners are fixed under earthenware chambers, communicating by means of pipes to effective ventilators in the roof, so that all fumes are immediately conducted out of the building.

A completely fitted Dispensary is attached to the College for the benefit of those Students who require instruction in this department.

CHEMICAL AND MICROSCOPICAL ANALYSES CONDUCTED.

Preliminary Classes Daily.

FEE—ONE GUINEA PER MONTH.

At the PRELIMINARY EXAMINATION held last month the following Students of the Westminster College were successful:—

Mr. C. T. BACK
„ A. B. CARRÉ
„ T. F. PRIME
„ F. W. THOMAS

Students intending to present themselves at the April Examination should join the Class at once.

Evening Classes & Laboratory Instruction

Every Tuesday, Thursday and Friday, from 7 till 9.
FEES—**Minor**, Three Months, **£1 1s.**; **Preliminary, 15s.**

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For the Preliminary, Minor, and Major Examinations.

Gentlemen who reside in the country, and are unable to attend a School of Pharmacy, may become Corresponding Students of this College on payment of a fee of £1 1s. for the Major or Minor, and 10s. 6d. for the Preliminary.

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"The idea on which this system is based is to arrange for each student his course of study for him, and to provide him generally with that knowledge which he needs to know."—*Chemist and Druggist.*

For Testimonials and further particulars apply to

Messrs. WILLS & WOOTTON.

"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

325, KENNINGTON ROAD, S.E.

Director: Dr. JOHN MUTER, M.A., F.I.C., F.C.S., &c.

ESTABLISHED 1ST OCTOBER, 1868.

THE NINETEENTH SESSION, 1886-7.

The next term will commence on the 15th April, 1887.

For Fees, &c., apply to W. BAXTER, Secretary.

"Concilio et Labore."

THE

MANCHESTER COLLEGE

OF

PHARMACY,

225 & 227a, OXFORD ST., MANCHESTER.

The Session commenced on Monday, January 3, 1887. Full particulars of the Classes, Fees, &c. (which are inclusive), will be sent on application.

At the January Minor Examinations the two gentlemen under-named passed from this School:—

Mr. JOSEPH BELL, Alnwick.
„ W. H. LOMAX, Darwen.

The Classes for the April Examination are now at work, and will shortly close. There are still vacancies in the Second Division of the Afternoon, Evening, and Once-a-Week Classes for the July Examinations.

APRIL MINOR.

IMMEDIATE application should be made by those wishing to join either the Day or Evening Classes, as very few vacancies remain.

DISPENSING LESSONS as usual. For Prospectus apply, VERNON MITCHELL, Secretary, Portman Pharmacy, 55a, Gloucester Pl., Portman Sq., W.

LONDON MATRIC.—All passed last June. Preparation by V. BUTLER SMITH, B.A. Lond., and qualified specialists; also Prelim. Med. and Pharmaceutical. Day and evening.—Prospectus on application to SECRETARY, Polytechnic, 309, Regent St., W.

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PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 3d. Cæsar Simplified, 1s. Knotty Points in Latin Grammar, 1s. 6d. MINOR.—Equations Simplified, 1s. Illegible Autographic Prescriptions, 1s. Notes on Dispensing, 1s. Prescriptions given at the Minor, 6d. CHEMIST, care of Mr. J. Edwards, Wye, Kent.

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Morning, Evening, Private and Postal. For particulars, call or write. Success guaranteed by result payments.

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DISPENSER.—Qualified. 11 years' experience, chiefly in London. Age 26. Out-door preferred. CHEMIST, 43, Noel St., Islington, N.

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AS ASSISTANT or DISPENSER. Age 23. 9 years' experience. Out-door. Permanency preferred. BETA, Whiteman's Library, Rye, Sussex.

JUNIOR or DISPENSER to Surgeon. 6 years' experience. Age 21. Height 5ft. 8in. MARSH, 77, Redcliffe Hill, Bristol.

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JUNIOR. 5¼ years' experience. Good reference. Abstainer. Age 20. H. R., 200, High St., Lincoln.

PART-TIME DISPENSER or ASSISTANT. London. Either in or out-door. Age 28. Good references. H., 22, Terrace, Spalding.

JUNIOR. Good experience and references. Would prefer in a large town where some time for study or classes. J. B. J., Evans, Sons & Co., Liverpool.

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MANAGER. 30. Minor. London experience. Disengaged. ALPHA, Mrs. Wright, Alcester.

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ASSISTANTS WANTED.

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GENUINE and old established, in N.W. district. Returns about £300 per annum. Death cause of disposal. Address, W. F., Messrs. Burgess, Willows & Francis, 101, High Holborn, London

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RENT free to March.—A Chemist's BUSINESS, in first-class neighbourhood. Dentist much needed. Shop nicely fitted. Good house. To be sold cheap. Address, A. B., Mr. Burgess, Chemist, 12, Foubert's Pl., Regent St., W.

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N.B.—Postage Stamps cannot be received in payment.

A FIRST-CLASS Dispensing and Retail, about £1000, capable of increase. BUSINESS, care of Mrs. Varley, 3, Broughton Drive, Cressington, Liverpool.

A GENUINE Dispensing and good class Family BUSINESS. Must bear strict investigation and show a nett profit of not less than £300 per annum. Midlands or South preferred. Principals are invited to confidentially state full particulars. CHEMIST, 18, Mount Ararat, Richmond, Surrey.

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TRANSFER AGENT & VALUER,

15, WALBROOK, E.C.

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Businesses thoroughly investigated for Buyers.

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Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. BRETT, Leicester.

To Manufacturing Chemists and Others.

THE Board of Works for the Wandsworth District are prepared to receive tenders for the supply of Carbolic Acid and other Disinfectants for one, two, or three years, at the option of the Board, from the 25th of March next.

The specification and form of tender may be obtained at the Offices of the Board, Battersea Rise, between the hours of ten and four (on Saturdays between ten and two).

Tenders are to be delivered at the Offices of the Board, endorsed "Disinfectants," on or before Tuesday, the 15th of February instant, and must contain the names and addresses of two responsible persons to join the contractor in a contract for the due execution thereof.

No tender will be received unless it is made upon one of the printed forms issued from these Offices.

The Board do not pledge themselves to accept the lowest or any tender.

By order of the Board of Works for the Wandsworth District.

HENRY GEORGE HILLS,
Clerk to the Board.

Battersea Rise, S.W.
2nd February, 1887.

PULVIS JACOBI VERUS,
PREPARED BY

Wilcox

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 869.] SATURDAY, FEBRUARY 19, 1887. [PRICE FOURPENCE.

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17, BLOOMSBURY SQUARE, LONDON.

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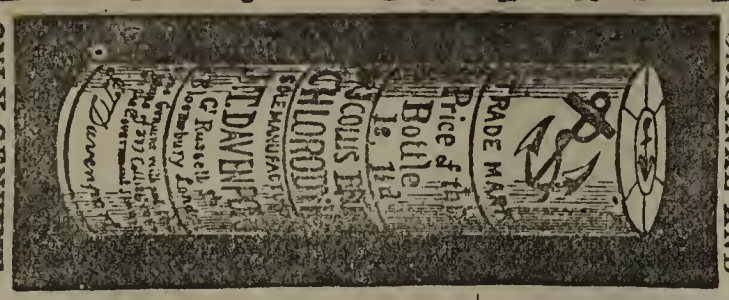
ONLY GENUINE.  ORIGINAL AND

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Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

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THE CHROMATE TEST OF QUININE SULPHATE.

BY DR. O. HESSE.

According to de Vrij, in testing commercial quinine sulphate by means of his chromate test the other cinchona alkaloids that may be present should remain in the mother liquor from the quinine chromate. The experiments that I have made with quinine sulphate containing hydroquinine and cinchonidine have, however, shown that de Vrij's statement is not quite correct. It is true that neutral chromates of hydroquinine and cinchonidine are more readily soluble in water than the quinine chromate, but they also possess the property of crystallizing out together with quinine chromate. Owing to this circumstance it happens that a mixture of quinine and hydroquinine sulphates containing up to 8 per cent. of the latter salt behaves exactly the same as quinine.

As regards cinchonidine sulphate it is true that quinine sulphate containing 0·3 per cent. of cinchonidine sulphate will give a mother liquor which, on evaporation, after having been made alkaline, yields a slight precipitate. It is also true that the quantity of the precipitate so obtained is greater in proportion as the amount of cinchonidine sulphate is augmented; but this increase in the quantity of the precipitate has no constant proportion to the cinchonidine present, since a varying quantity of this crystallizes out with the quinine chromate. Moreover, the precipitate obtained is not cinchonidine, or at least for the most part, but a compound of seven molecules of cinchonidine with one molecule of quinine, not as I formerly supposed (see before, p. 486)* the compound, $C_{20}H_{24}N_2O_2.2C_{19}H_{22}N_2O$, which de Vrij would have obtained in testing the sulphate by his new test. The former compound, it may be mentioned, can be obtained by dissolving the latter in hot dilute alcohol; on cooling large brilliant rhombohedrons separate, which have a composition represented by the formula, $C_{20}H_{24}N_2O_2.7C_{19}H_{22}N_2O$, containing 13·6 per cent. quinine and 86·4 per cent. of cinchonidine. By analysis I have obtained 13·7 per cent. quinine and 86·3 per cent. cinchonidine.

The presence of quinine in the precipitate which de Vrij took to be cinchonidine is the reason why the amount of cinchonidine is sometimes apparently found to be higher than it really is. In most instances, however, the result obtained is too low, notwithstanding the presence of quinine in the precipitate.

When the sulphate contains but little more than 0·3 per cent. of cinchonidine, the chromate obtained also contains cinchonidine. If the amount of cinchonidine is considerable in the quinine sulphate, it may happen that the air-dried chromate, when shaken with ammonia and ether will not only yield the compound $C_{20}H_{24}N_2O_2{\cdot}2C_{19}H_{22}N_2O$, but will also contain more water of crystallization than corresponds with the correct formula of the pure green chromate.

The general result of my experiments therefore proves the justice of the opinion previously expressed by me, that the cinchonidine in quinine sulphate cannot be correctly determined by means of the chromate method.

* The above communication was already written when I received from Mr. van der Steen the reprint of a paper (from the *Indische Mercur*, No. 5, 1887), in which this chemist mentions the compound, $C_{20}H_{24}N_2O_27C_{19}H_{22}N_2O$, as having been obtained by him under other conditions than those mentioned above. I may also add that in 1884 I had maintained, in replying to de Vrij in the *Pharm. Weekblad*, that the cinchonidine separated from an ether solution containing quinine contained about one-third its weight of quinine, but whether it was a compound or only a mixture of the two alkaloids could not then be determined.

PHARMACOPŒIAL TESTING.*

BY BARNARD S. PROCTOR.

Pharmacopœial testing may have various different objects, and the nature of the qualitative and quantitative examinations will naturally vary according to the views of the compilers.

In page xiii of Preface we find it said "The Pharmacopœia having for its object, not so much the selection as the definition of substances which the physician prescribes, and which are required to be kept at one safe and uniform standard of strength and composition." And further on we are told the descriptions are "intended to enable those who are engaged in the administration" [of the articles described] "to determine the identity and test the purity of such as are met with in commerce."

What are we to understand by the words "Those who are engaged in the administration" of medicines? Surely not the mothers or the nurses; surely not the public analysts, or the manufacturing chemists.

The literal acceptation of the words would indicate the former; the examination of the processes would in many instances imply the latter—that the processes were to be used by professional chemists with laboratories and analytical apparatus always ready for use, if it were not for the loose statements and clumsy mixing together of weights and measures which so frequently occur.

Take for example the first chemical in the Pharmacopœia, vinegar. We are told that 445·4 grains requires about 402 grain measures of volumetrical solution of soda for neutralization. Why take this odd number of grains, including a fraction exact to the tenth of a grain, and then tell you it requires "about" so much soda? The reason is apparently that we may take a fluid ounce, which according to the B.P. statement should have this weight.

But the specific gravities indicated show that the fluid ounce may vary from that weight, however accurately it may be measured, and furthermore a measure that would enable any one to estimate it with that exactitude probably does not exist, unless it be in the office of the official standards.

It is equally absurd to inform us that "about 402 grain measures of volumetric solution of soda correspond to five grains and forty one-hundredths per cent. of real acid." About so much soda is equal to an exact quantity of acid defined to the hundredth of a grain!

This is a muddling together of loose and exact terms which would be discreditable to a candidate for the Minor examination. Which member of the Committee of Council is responsible for this ill-considered and slovenly work?

No one! No one would have written it in a work for which he was to be individually responsible. It was the work of a corporate body, and corporate bodies have not a part suitable for casti-

* Read before the North of England Pharmaceutical Association, Feb. 10.

gation. It is useless, therefore, to spend blows upon the unkickable. Let us give our attention rather to what should have been done.

The Committee should have maturely considered what line it intended to take and then worked consistently upon that line.

It may be desirable that definitions should be given which would be suitable as standards for the makers to aim at, and guides to the public analysts and the magistrates in their findings when samples are submitted to them.

If that were the object held in view by the Pharmacopœia Committee, the definition of vinegar remaining as it is, the characters and tests might fairly have been reduced to the statement:—"It should not contain less than 5 per cent. or more than 6 per cent. of real acetic acid ($HC_2H_3O_2$) and not more than 0·1 per cent. of sulphuric acid. It should be free from copper, lead, and other poisonous metals."

Neither manufacturers nor analysts require to be told anything about fluid ounces or their weight. Nor is it important to tell them the specific gravity for it does not indicate either correct strength or purity. The official strength and purity being defined within certain limits, they know how to ensure the same or to ascertain it without being told anything about volumetric soda, chloride of barium, or sulphuretted hydrogen. And if the public analysts felt that these particulars were addressed to them, their sentiments would be something about little boys teaching their grandmothers.

If, on the other hand, the desire of the compilers was to give such characters and tests as would enable pharmacists to keep close watch upon the quality and strength of such preparations as they buy ready-made,—and this I contend is the legitimate object which they should have kept in view from beginning to end,—the code of tests might have been greatly simplified and rendered more useful by being more usable.

The definition of vinegar being left as it is at present given—"An acid liquid prepared from malt," etc.—the pharmacist does not require to be told that it is a liquid of a brown colour and peculiar odour. He most likely knows what vinegar smells like, and if he does not the statement that the odour is peculiar is not much help to him. It is no use telling him the specific gravity, which is not an important index to anything. It is no use telling him that a fluid ounce may weigh exactly 445·4 grains, as it may weigh exactly something else. If the pharmacist wanted a fluid ounce he would take it by measure; regardless of whether it was exactly that weight or not. And if he wanted exactly that weight he would weigh that quantity exactly, regardless of whether or not it measured the fluid ounce. It would, however, be useful to indicate to him how he might readily determine whether or not any given sample of vinegar was of legitimate strength and purity. To the professional analyst, who has his volumetric acid and alkali always standing in the burettes ready for use, a volumetric examination is a very simple matter; but to the average pharmacist, even among examined men, the volumetric appliances are not in daily use, and if the examination of the vinegar has to depend upon them it will generally remain unperformed, though it might be undertaken if it required no more formidable operation than the dispensing of one or two ordinary mixtures. This might be done in the case of vinegar by saying that "a fluid ounce should dissolve 18 grains of carbonate of magnesia, but should fail to dissolve an additional grain." This would accomplish the examination by the use of the simplest appliances always at hand, and with all the accuracy which can be necessary for an article dispensed by fluid ounces, or taken by spoonfuls. Commercial vinegars are often much stronger than this, but as the official dose is from 1 drachm to 1 ounce, and the domestic dose is as much as you like, there seems very little occasion to give it any very strict definition.

By the adoption of any such test as that I have suggested the inconsistencies and absurdities before noticed would be removed from the Pharmacopœia, and the testing with chloride of barium and sulphuretted hydrogen might remain as at present, though if the compilers could condescend to give useful and intelligible information they might say, "vinegar usually contains a little sulphuric acid; 1 fluid ounce of vinegar precipitated by 1 grain of chloride of barium, and filtered, should not give any further precipitate with more of the chloride of barium, and the absence of copper and lead should be indicated by the vinegar giving no precipitate with sulphuretted hydrogen."

I have spoken at some length about the testing of vinegar, simply taking it as an illustration of what might be said or done with regard to many other medical materials. The Pharmacopœia Committee would not have shown any lack of judgment had it omitted the testing of vinegar altogether. It is of no medical importance.

The carbonate of magnesia test might be adopted with equal advantage and greater utility to the testing of nitric, hydrochloric, and some other acids. And there are many other cases where chemicals which are naturally variable might have the latitude of their variation defined within desirable limits by the method exemplified in the case of sulphuric acid in vinegar, where all the latitude to be allowed must be covered by a given quantity of a common reagent.

I anticipate sundry objections to adopting this mode of working. First, the essentially rough estimation of fluid ounces or drachms measured in pharmaceutical graduates. And the question,—If the carbonate of magnesia is to prove that the acid is of right value, what is to prove that the carbonate of magnesia is not deficient? First, with regard to the measures. If fluid ounces and drachms are sufficiently accurate for the compounding and dispensing of medicines, it cannot be of great importance that their percentage of active matter should be determined with any greater refinement. And I should not suggest the estimation by ordinary graduates of any analytical quantities except where the material under examination was habitually used by the same. Now regarding carbonate of magnesia. Why do I select carbonate of magnesia? And what other chemicals can we select for use in this way?

To test the neutralizing power of an acid with a base which is variable in quality would be futile; but we may select certain chemicals which, from the nature of the processes used in their production, are little liable to accidental impurity, and which from the lowness of their price, or from the ease with which adulteration would be detected, are not liable to sophistication. Carbonate of magnesia is one of

these substances; it is cheap and habitually found in commerce almost absolutely pure and constant in composition. Being practically insoluble and tasteless, colourless and odourless, the great bulk of impurities are excluded. Being free from hygroscopic and efflorescent or volatile properties, it is free from other risks of variation, and taken altogether it is a substance which we should willingly take as a type of what would be satisfactory purity and uniformity in pharmaceutical products.* If we compare the alkaline carbonates, potash is irregular from its hygroscopic quality and soda from its efflorescence in its crystalline state, and its hygroscopic property in its dried state; ammonia from its continual variation is quite out of the question. The bicarbonates of soda and potash are not sufficiently constant in the proportion of carbonic acid and water to be trustworthy. I therefore select carbonate of magnesia, and with it may be tested, in the manner I have described, the majority of the acids where the B.P. directs the use of volumetric soda.

In May, 1883, Dr. Quain, as Chairman of the Pharmacopœia Committee, sent me the circular requesting pharmaceutical aid in the revision of the Pharmacopœia. I now quote from one of the letters in reply, which I addressed to that Committee:—

"The line of duty of the pharmacist towards the work is to aid in making the remedies in the hands of the physician forces of precision. The failing of the pharmacist is apt to be his over-attention towards the appearance of his preparations or their attractive qualities, and I fear I must add the failing of the medical profession is in being led away by the glowing recommendations of 'nice preparations' or 'valuable combinations,' the exact nature of which is undefined. Most of my suggestions will be guided by the following considerations:—

"1. That a drug should have a known degree of therapeutic activity.

"2. That a drug is not better for being above its normal standard of activity.

"3. That preparations should have the elements of constancy in their nature; if possible, their constancy should be greater than that of the crude drug from which they are prepared, and they should be little liable to change by keeping.

"4. That simple forms are, as a rule, better than those more complex, and useless constituents are better omitted.

"5. That in all cases the attractive qualities should be subordinated to those of more practical importance, namely, activity, constancy and permanence.

"6. That preparations which are essentially wanting in the elements of constancy should be discouraged in use by being excluded from official recognition.

"7. That the strength and purity of preparations or crude drugs should be defined, where practicable, within certain narrow limits. Thus if animal charcoal be spoken of as nearly pure, the allowable amount of its ash should be defined: and if the normal strength of powdered opium is 10 per cent. of morphia it should contain not less than 9·5 and not more than 10·5 per cent."

Having thus suggested to the Committee what I considered to be above all things the important aim, the reduction of the materia medica to forces of precision, I followed with nearly a hundred suggestions of detail, with that aim as my most prominent object. A fair proportion of these have been acted on, but there are yet many others which I think might have been adopted with advantage.

Among other things I suggested the propriety of abolishing the mixed use of fluid ounces with volumetric grains by measure. I should be very glad if the Committee could see the folly of the old instructions, or the wisdom of making new rules which should be consistent either in the weights and measures customarily used by analysts, or better still, leave the professional analyst to take care of himself, and give the instructions in such form that they could be readily worked at the dispensing counter.

Among chemicals which can be depended upon as being sufficiently pure for standards, the Pharmacopœia recognizes several. Dry carbonate of soda, produced by heating to redness a pure bicarbonate, being the standard upon which are founded all volumetric determinations of acids and alkalies.

You are required to produce your volumetric solution of oxalic acid (B.P., page 493) by making it of such a strength that 1000 grain measures are exactly neutralized by 53 grains of the dry carbonate of soda, and it looks a little absurd to see that the purity of the carbonate of soda is to be indicated by 53 grains of it exactly neutralizing 1000 grain measures of volumetric oxalic acid (B.P., 366). This is reasoning in a circle. The authorities dare not tells us that they have based anything so important as alkalimetry and acidimetry on the purity of a commercial chemical. They leave us to find that out. In fact, they try to conceal it by apparently checking both reagents while they virtually check neither, but simply assume that a bicarbonate of soda, which indicates little or no chlorides or sulphates with the usual tests, will yield a mono-carbonate pure enough to be the standard for all acids and alkalies.

Bichromate of potassium is assumed to be pure if free from sulphates and chlorides—no pretence at cross testing occurring either in the Appendix or body of the work. It is an anhydrous salt and not hygroscopic; it is easily prepared pure, and is cheap enough to be no temptation.

Iodine is another commercial chemical that is virtually trusted as a standard if it gives no indication of cyanide of iodine, and leaves no fixed residue. But in this case, as in the carbonate of soda, we have the circular reasoning. The Appendix instructs us to make a volumetric solution of hyposulphite of soda of such a strength that 1000 grain measures of it shall be the equivalent of 12·7 grains of iodine (B.P., 490), and the body of the work directs us to prove the purity of our iodine by seeing that 12·7 grains of it requires for complete decoloration 1000 grain measures of volumetric solution of hyposulphite.

If we turn to calcium hypophosphite we find it said "5 grains boiled for ten minutes with a solution of 12 grains of permanganate of potassium yields on filtration a nearly colourless solution" (B.P., 87). This is a simple and ready test more likely to be used than if the volumetric apparatus were re-

* 20 grains of carbonate of magnesia as taken from the shop bottle when dried at 212° F. lost 0·5 gr. It regained 0·3 by a day's exposure to the air, and in a week regained the 0·5 originally lost. 20 grains of dry carbonate of soda gained 0·75 in three days and 1·0 in a week.

quired. The purity of the permanganate is apparently assumed. Perhaps it might be assumed, but it is not; for on turning to page 331 we find 5 grains of the permanganate require for decoloration a solution of 44 grains of granulated sulphate of iron, and unless you have proved this your examination of the calcium salt would have no official recognition. But the matter does not end here. Is your granular sulphate of iron trustworthy? In fact it is a salt quite likely to vary. Commercially it is frequently damp and if dried it has some tendency to effloresce and also to oxidize. However, the Pharmacopœia provides for that contingency, and directs you not to trust to the granulated sulphate of iron unless you have proved that 41·7 grains of it require exactly 500 grain measures of the volumetric solution of bichromate of potassium before it ceases to give a blue precipitate with ferricyanide of potassium.

So when you wish to test your hypophosphite of calcium think of the poor old woman whose pig would not get over the stile. The bichromate of potassium will not prove the granular sulphate of iron, the granular sulphate of iron cannot prove the permanganate, the permanganate cannot prove the hypophosphite of calcium, and we have no physic for our poor old patient to-night.

This is not the only instance in which the compilers of the Pharmacopœia lead us a dance after results which is somewhat like following will-o'-the-wisp. Arseniate of soda is to be tested with acetate of lead, but the acetate of lead is only to be trusted if it has been tested with oxalic acid, and the oxalic acid must be proved by the dry carbonate of soda.

One might think that the Pharmacopœia Committee had been larking with us were such a thing possible.

> The shades of pharmacy repose
> Deep in red woods,* and at fields green.†
> The sober light no longer glows,
> Will-o'-the-wisp instead is seen.

It would not be difficult to draw up a considerable list of chemicals which we habitually find in commerce in a condition closely approaching purity; quite sufficiently close to theoretical purity to permit of their being used as standards of comparison for those which are essentially variable, or not evidently constant in chemical value.

Before I enumerate examples of these I must emphasize two important points; first, the distinction to be drawn between the cases where the impurity is a simple subtraction of activity and the cases where the impurity is itself an active agent for good or ill. In the former case 3 or 4 or 5 per cent. of impurity may be a matter of very little moment. In the latter case 3 or 4 or 5 parts in ten thousand may be of serious consequence. Take for example strong solution of perchloride of iron. It may contain 3 or 4 or 5 per cent. of oxide of iron, hydrochloric acid, or water as impurities or diluents of its normal activity, but that is of no moment, while the presence of arsenic in the proportion of 3 or 4 parts in ten thousand would totally condemn the article. When I say that 3 or 4 per cent. more or less than the theoretical quantity of iron is of little moment, I say it advisedly. I say it because it is true, even though some of my quixotic friends may feel horrified at such heresy. The B.P. says the specific gravity shall be about 1·42, and a fluid drachm shall yield between 15 and 16 grains of peroxide of iron by precipitation with ammonia.

As regards the precipitate I consider this is good pharmaceutical standardizing. In fact much better than in the case of solution of persulphate of iron, where the precipitate yielded by a fluid drachm is defined to the hundredth of a grain; that is to say a fluid drachm shall yield 11 grains and 44 hundredths.

On the other hand, the gravity of the perchloride liquor is not satisfactorily defined,—"about" so much is a loose expression, we do not know how much latitude is allowed. It is better to define it strictly between certain bounds. Instead of saying about 1·42 say between 1·41 and 1·43, and then we have a strictly defined liberty. Where the permissible latitude is strictly defined, the boundaries are more likely to be respected than they would be if the loose expression "about so much" is used; and if the reasonable latitude is allowed where it is permissible, the absolute injunctions are more likely to be respected when they are important.

We respect the requirement that the test for arsenic shall yield no white crystalline sublimate, and feel the justice and reasonableness of putting this impurity on a totally different footing from those which are simply adding to or subtracting from the theoretical potency to a small and definite extent.

Keeping these circumstances in view, a number of chemicals which we know are not absolutely pure may be quite satisfactory for testing purposes.

Good brands of bicarbonate of soda if heated to redness yield dry carbonate of soda of almost absolute purity. This is the usual standard, not only in the B.P., but in commercial analysis, by which acids are determined, and from an acid so standardized, all alkalies in turn are estimated, but as it has a slight hygroscopic quality it requires to be freshly ignited if accurate work is looked for.

Common commercial oxalic acid is usually so nearly pure that it might be used as a standard for pharmaceutical use without purification, and a single recrystallization is sufficient to put it beyond all question for our purposes, that is for standardizing pharmaceutical products.

Chloride of barium is also a common cheap chemical, commercially very pure; but had it been far from pure in most cases in which it is used that circumstance would be of little moment. Take the vinegar test for example. One grain of chloride of barium precipitates all the sulphuric acid in 1 ounce of vinegar, and if the chloride of barium contained 10 per cent. of impurity it could not make more difference in the test than about 1 part of sulphuric acid in 10,000 of vinegar.

In many other cases the impurity of the chloride of barium would make no difference at all to the result. And in some few cases, such, for example, as the testing of aromatic spirit of ammonia, it would make more difference to the result, though even in that instance the vitiation of the result arising from 10 per cent. of impurity in the barium salt would only falsify the relationship between the carbonate and caustic ammonia present to an extent which would have no practical importance. But again I have to say chloride of barium of commerce is nearly pure $BaCl.2Aq$, or $(BaCl_2 2H_2O)$.

Chloride of ammonium is another of the commonly

* Red woods, *i.e.*, autumnal tinted.
† At fields *green*, *i.e.*, in the spring time of life.

pure chemicals; it has so little applicability that I need not have noticed it but for the sake of pointing to the security which sublimation gives. The common sal ammoniac frequently has a yellow streak from a trace of chloride of iron, and it may contain other chlorides, for all chlorides are volatile, but from the nature of the process of manufacture the traces of impurity are usually very small, and if used as a means of estimating silver—the only purpose in connection with the present subject for which we are likely to use it—these traces would be of little moment, while the granulated chloride, which is usually supplied as pure, would be less reliable. It is usually moist, and would require drying before a given weight of it could indicate a definite quantity of silver.

Common commercial iodine is a chemical very nearly pure; it usually contains a trace of water, and a trace only of fixed impurity. The cyanide, which is sometimes spoken of as an impurity, and is guarded against in the B.P. by the sublimation test, I have never seen. The resublimed iodine of trade may be regarded as a high standard of purity for such comparisons as are required in pharmaceutical testing. The cross testing and circular reasoning, which I just now noticed, are uncalled for as well as useless.

Common hyposulphite of soda, at a penny per pound, is so nearly pure as to be fit for all the B.P. testing required of it, without forming a volumetric solution to be titrated with iodine. Select a good clean crystal, scrape off as much as you require for your operation, and you will have it up to about 98 per cent. of its theoretical value. Do you think I am guilty of laxity in saying two or three per cent. of deficiency is of no moment? The hyposulphite is used for the testing of chlorinated lime and chlorinated soda. What does the B.P. say about solution of chlorinated lime? It says it should yield not less than about 2 per cent. of available chlorine, and adds, "When the solution of chlorinated lime is made with the best chlorinated lime and is quite fresh it may yield about 3 per cent. of available chlorine." That is, it may be 50 per cent. above what they adopt as standard. But what about the standard? It assumes that we shall not habitually make our solution from the best material or not have our solution in good condition. But the B.P. kindly gives us permission to have it made of the best and well kept. If all this latitude be permissible—30, 40 or 50 per cent.—why this elaborate preparation of volumetric solution and 1000 grain burette?

If the solution is of sufficient importance to require any titration at all, I think it should be with a narrower limit than here allowed. I should say a fluid drachm in an ounce of water with 20 grains of iodide of potassium and 2 drachms of hydrochloric acid should retain a yellow colour on adding 10 grains of hyposulphite of soda, but the colour should be removed on adding 2 grains more of the hyposulphite.

I have now probably said enough about the testing of the inorganic materia medica, for my present object is only to indicate the lines upon which a reform should proceed; but before concluding I wish to say a few words upon the testing of spirit of nitrous ether.

It is essentially a variable article, variable from the difficulty of preparing and the difficulty of preserving the article when obtained. In these respects the present B.P. has made distinct progress, but is yet open to criticism. The fact that the Inspector of Food and Drugs recently paid a visit to a number of us in connection with this article gives it an additional interest at the present moment, and I shall show you the B.P. process of testing in operation. I had repeatedly made examinations of spirit of nitrous ether by the old method with solution of chloride of calcium, with most unsatisfactory results, but I had no practical acquaintance with the present process till my attention was directed to it through conversation with the city analyst at the time the first lot of samples were submitted to him. The inspector had not supplied him with a sample from my shop, so I gave him one illustrating the condition in which it might be expected to be found under fair ordinary circumstances—that is, I had not examined it, but bought it as B.P. from a good source, it was not less than a month old, it was taken from the shop shelves as it would have been for any retail customer, and the shop bottle was about two-thirds full. This he reported to me to be up to B.P. requirements. So far satisfactory; but it left me with the determination to put up a nitrometer, and look after my spirit of nitre myself by the B.P. process, unless I could devise a better. The nitrometer now on the table is the instrument which I extemporized at the time; you observe it is such as could be extemporized out of the materials to be found in any chemist's shop. It consists of three glass syringes. The syringe to hold the gas I graduated into fluid drachms to facilitate the working with pharmaceutical measures, the connections are feeding bottle tube, and the wooden support is a specimen of my carpentry. The pinch cock is the only part specially purchased for the purpose. The first fault I find with the B.P. in this case is, that it adopts a test for which it does not give the necessary instructions for carrying out, but refers us to the pages of the *Pharmaceutical Journal* to see how it is to be performed. Next I consider the process much too special and elaborate to be resonably required of the average pharmacist. Thirdly, with all its special apparatus and solutions, its note of temperature and barometric pressure, a considerable and ill-defined latitude is allowed. When freshly prepared it is required to yield "seven times its volume of nitric oxide gas, and even after it has been kept some time"—it has always been kept "some time,"—"and the vessel containing it has occasionally been opened, it should yield not much less than five times its volume of the gas." How much is "not much?" Perhaps four is not much less than five, but if that interpretation is legitimate why not say definitely, "it shall yield not less than four volumes, and not more than seven volumes of nitric oxide gas." If four volumes is too low, say four and a half, or say five; but let it be a definite minimum and a definite maximum. I am quite content that all reasonable allowance should be made, but I protest against this pretence of refinement and accuracy in requiring barometric and thermometric observations, and then concluding with such laxity as is involved in the expression "not much less than five."

I think we may assume that in the statement that it shall yield when fresh seven volumes of gas we are to understand seven volumes, and neither more nor less, though that might be a nice point for the lawyers to decide if anyone were put on trial for an

overstrength, and such a thing does not seem improbable in the light of the experience of our public analyst, who has had samples varying from one to eleven volumes of gas.

I will now give you a demonstration of the B.P. process for testing spirit of nitrous ether, and then a demonstration of another process, which from its simplicity has some recommendations as a process for the dispensing counter. Before the introduction of testing spirit of nitrous ether by the nitrometer, which I must say is much to Mr. Allen's credit as a process for the public analyst, several other modes had been tried which depended upon the same reaction, notably Mr. Dott's method, liberating the iodine by this reaction, and estimating the amount liberated by titrating with hyposulphite. This I believe will not be found quite so accurate as Mr. Allen's, and not much less complex. It forms, however, a guide to what I think should be an acceptable process to pharmacists generally.

Solution No. 1.

℞ Sodii hyphosulph. . . . . gr. iv.
Sodii chloridi . . . . . gr. xl.
Potassii iodidi . . . . . gr. xx.
Aq. . . . . fʒij.
Solve.

Solution No. 2.

℞ Spirit. ætheris nitrosi . . . . . fʒij.
Acid. sulph. dil. . . . . fʒj.
Misce.

Place the former solution in a small dish, a two-ounce ointment pot is suitable.

Pour into this fʒiss. of the No 2 solution and stir till the effervescence has passed off. The mixture should be free from iodine colour. If not so the spirit of nitre is stronger than should be used. If no iodine remains free after the effervescence has passed off, add fʒss. more of the No. 2 solution (total fʒij.). This should now produce a permanent brown colour if the spirit of nitre is up to its normal strength. But if a second addition of fʒss. (total fʒiiss.) is required, it is below its normal, but not unfit for use; but if this second fʒss. fails to produce a permanent brown colour, the spirit of nitre is too weak to be sanctioned.

This method of operating would require no apparatus but what every dispenser has always at hand, and no operation but what he is daily performing. It would take very little time and cost almost nothing. It would allow a reasonable latitude with a limit of strength as well as a limit to weakness, and the latitude is not greater than the B.P. allows. If a number of tests are to be made, it may be further simplified by having No. 1 solution made in bulk, so that fʒiij. shall exactly represent the four grains of hyposulphite; but I have not yet had experience enough to say how long the solution would be reliable; probably in a neutral or alkaline state it may keep unchanged for a long time.*

It may appear that in suggesting a rougher and readier mode of examination I am proposing to progress backwards; this, however, I cannot acknowledge. It is better to be consistent within practically useful limits than to have a mixture of useless refinement and unnecessary laxity. I do not suggest latitude so great as some already tolerated by the B.P. I do not desire that anyone should have his chemicals one whit less perfect than he now aims at or accomplishes. But I do desire that the tests of the Pharmacopœia should be such as the pharmacist might be reasonably expected to put in frequent operation, and such as would readily give him the assurance that his chemicals were safe from exposing him to penalties; or, if his chemicals were not so, that he should readily detect the fact.

I do not propose any laxity regarding the presence of impurities which might be of consequence to the patient, or any variation which might be detected by anything short of a chemical examination. In fact, the greater latitude that I would allow for the sake of having tests workable by the ordinary pharmacist with the appliances to be found on his dispensing counter only admits of variations the size of a gnat, compared to the camels which go down the throats of our patients by spoonfuls.

The Pharmacopœia gives us the example of latitude in chloride of lime solution being permissible 50 per cent. over its standard. In spirit of nitrous ether being allowed 30 or 35 per cent. below its standard. In carbonate of potash having about 16 per cent. of water, a small but indefinite latitude being allowed. In bromide of potassium being allowed a small but well-defined and reasonable latitude, as expressed in the statement that 10 grains require not less than 838, and not more than 850 grain measures of nitrate of silver solution for complete decomposition. It is because the definiteness of the requirement in one case is better than the indefiniteness of the other, that I am wishful to see the statements made general of what theory requires, and what in practice we may permit.

If it is not sufficiently evident how scientific accuracy can be combined with the less strict definition of pharmaceutical requirements, I may explain by taking in illustration the case of citric acid. The Pharmacopœia defines it as being $H_3C_6H_5O_7,H_2O$. This is a precise statement of the proportion of every element it contains, and includes hypothetical arrangements enough to satisfy the desires of those who must have a theory of its constitution. We have hydrogen apparently performing three functions, and oxygen two. If we strike out the volumetric test, and say 37 grains of citric acid in 2 ounces of hot water make a clear solution with 24 grains of heavy carbonate of magnesia, but fail to dissolve an additional grain, we have all the latitude and all the exactitude which is desirable to insist upon for pharmaceutical use.

I am also wishful that the good example shown by the United States Pharmacopœia should be followed, in making general the statements of what is sought to be established by such of the tests as are not of every-day application. Under "Black Antimony," in the B.P., we are informed that the appearance of a crystalline sublimate in one of the processes of testing would indicate the presence of arsenic, though this is not by any means a very obscure point. If it is not beneath the dignity of a Pharmacopœia Committee to explain its object in this case why should it not also explain that the object of

* As a demonstration of the working of this process, four samples of spirit of nitrous ether were tested in the course of a few minutes, two of which had previously been tested by the nitrometer, giving confirmatory results with the new working method, and two which had been procured by the Secretary for examination at the meeting. One of these, marked ·850, gave the iodine colour with the first additional fʒss. of No. 2 solution (total fʒij), and was pronounced of good quality. The other, marked ·845, gave a strong iodine colour with the fʒiss. of No. 2 solution, and was pronounced over strength. This on a subsequent examination with the nitrometer gave 9 volumes of gas.

testing acetic acid with zinc and HCl is the detection of sulphurous acid?

Why not tell us what is the impurity likely to be present in meconic acid, which would give a precipitate with a solution of iodide of potassium and iodine? Why not tell us what impurity in phosphoric acid would be detected by a solution of albumen, and what other impurity is sought for by testing with perchloride of mercury and heat? Though nitric acid is well known as a test for albumen the converse application of this reaction is not so common as to make an explanation undesirable. The United States Pharmacopœia does not use this test, but includes the mercuric chloride test, and attaches the explanation that it indicates the presence of phosphorous acid.

It will necessarily be long before any alteration can be made in the modes of pharmacopœial testing, and it is desirable that the subject should, in the mean time, have the attention of those most interested in it, and have a full expression from them of what would be a useful help to them in their endeavour to do their duty towards the physician and his patient. I do not suppose I shall live to see my views carried out; but if others agree with what I have indicated, there is little doubt that a free expression of opinion would meet with respectful consideration from the authorities.

During the revision of the B.P. for the 1867 edition, I suggested that the resin of scammony from the root should take the place of the native product in colocynth pill and extract. Dr. Quain in reply, said, "The variety of opinion is something remarkable. I have just been in communication with Mr. Squire, here, who urges that the resin of scammony should be excluded." The Pharmacopœia Committee of that date compromised the matter between Squire and Proctor by giving the resin of scammony a place in the compound extract of colocynth and retaining the virgin scammony in the pill. It might suit the policy of the Queen's Chemist to have a costly drug, though it might have no advantage over a cheaper one, except that of enabling him to have a finer quality than the common run of chemists. So long as virgin scammony was the only official form, the supply was not sufficient to meet the demand, and the common run of chemists could not all get it as fine as Mr. Squire. But the resin having in my hands and in my interior proved itself equal to the other, my sense of what is good for the greatest number impelled me to advocate its general adoption, and this common-sense view at last gained the day, and the resin of scammony is now, in the 1885 edition, permissible in all cases, except the rare one of emulsion of scammony.

Now it is upon precisely parallel grounds that I advocate the modification of our official testing, and the adoption of what is practically good and within the compass of the common run of chemists who have intelligence enough for the ordinary operations of pharmacy and ambition enough to wish to do their duty well.

I do not wish to deprive the scientific man of the pleasure of boasting his superiority. There is always room for the exercise of superior talents, and where the public appreciates science the scientific man will have his reward without the necessity of creating difficulties and pit-falls for the poorer brethren who may be less favoured in their prospects of reaping a pecuniary harvest from scientific culture.

METHYLAL.*

BY B. W. RICHARDSON, M.D., F.R.S.

At the meeting of the British Association for the Advancement of Science, held at Norwich, in 1868, I brought out for the first time the chemical fluid called *Methylal* as an anæsthetic and hypnotic, and at a meeting of the same Association at Exeter, in 1869, I again drew attention to it in order to make it useful in practice.†

Methylal is a colourless fluid of specific gravity 0·855; its vapour density is 38°, taking hydrogen as unity; and boiling-point of 42° Cent., 107·6° Fahr. Its solubility in blood is one part in three; its composition is $C_3H_8O_2$. It is made by distilling methylic alcohol with sulphuric acid in the presence of peroxide of manganese, but it requires several re-distillations before it can be obtained in the pure state, for which reason it is at present a very expensive compound. The first specimens with which I experimented were made in my own laboratory; later specimens have been made for me, with much care, by my friend Mr. Williams, the well-known operative chemist.

When methylal is quite pure it is almost tasteless, but bites the tongue, and owing to its low boiling-point quickly evaporates. The odour of it is fragrant, and not very powerful. The pure vapour creates no irritation on being breathed.

After long exposure to the vapour of methylal, in an atmosphere containing not less than 35 per cent. of the vapour, warm-blooded animals may be made to pass into a sleep which, once established, is deep and prolonged. In my first researches the sleep so induced lasted for intervals of two and even three hours, but I believe now that this long narcotism was due to the presence of acetone, from the methylal not having been sufficiently purified. Last year with a perfectly pure specimen, made by Mr. Williams specially for my work, I endeavoured to anæsthetize two dogs with methylal in order to enable Mr. Mavor, the veterinary surgeon, to operate upon them painlessly. After half an hour's inhalation of the vapour narcotism was not produced. The fluid was then injected hypodermically in one animal to the extent of an ounce dose, upon which a gentle sleep, or rather intoxication, followed, but with no sufficient anæsthesia to allow of painless operating.

In my report of 1869 I showed that methylal, which is very soluble in water, could be administered by the mouth when diluted with water, or by hypodermic injection, and I have prescribed it occasionally, as a mixture several times. I usually begin with a fluid drachm dose, mixed either with glycerine or syrup of orange flowers and distilled water. Example:—

Methylal, pure	℥vj.
Syrup of orange flowers	℥iv.
Distilled water	℥vj.

Mix. To make a solution of 6 ounces; of which let 1 to 2 fluid ounces be taken in a wine-glassful of water as directed. The dose may gradually be increased to twice the above quantity or more.

In action, as a medicine, methylal lies between alcohol and anhydrous ether. It quickens the action of the heart with reduction of arterial pressure; it makes the respirations slow and deep; it induces a tendency to sleep; and, it is a sedative to pain, but not to a very deep degree. On the whole it would be best to keep it in the group of anodyne antispasmodics, in which I originally put it. It causes very little muscular excitement and no vomiting, but after long inhalation of its vapour it produces a free flow of saliva. As it mixes well with alcohol and with ether it might be administered with either of these agents; and it might also be given with amyl nitrite for the relief of colic, asthma, angina pectoris or tetanus; but before it can come into general use it must be reduced in price.

* From the *Asclepiad*, No. 13.

† 'Reports of the British Association for the Advancement of Science,' vol. xxviii., pp. 183–4, Norwich meeting; and vol. xxix., p. 403, Exeter meeting.

Signor Personali, who has recently been experimenting with methylal, seems to have arrived at results similar to my own; but he adds that it may be used as an ointment or liniment for external application. It is true that it mixes fairly with oil and with lard; but as it boils at 107° Fahr. I cannot see how it can be of any service for external use, except in causing a slight local anæthesia by cold, from evaporation.

THE SULPHUR INDUSTRY OF THE UNITED STATES.*

BY HARRY C. MYERS.

The mineral deposits of the great West have for many years attracted a great deal of attention, both in the United States and abroad. Besides the common minerals and compounds that chemists acknowledge as existing, there are beds of pure white kaolin, mineral wax or ozokerite, borax, petroleum, bituminous coal veins forty feet thick, rich sulphur deposits, etc. Sulphur, I believe, is not recognized by text-books as existing to any extent in the United States, and yet, in the Territory of Utah, there is beyond doubt the richest and largest known sulphur deposit in the world.

It would seem by the extent and purity of *this* deposit, however, that at some remote period the sulphur must have poured out in a molten mass and flowed like lava into the valley beneath. This enormous deposit was located in about 1870 by the Government Surveyor, and is situated two hundred miles south of Salt Lake City, between the counties of Millard and Beaver on Cove Creek.

The deposit is about two thousand feet square, and shafts have been sunk in different places from thirty to sixty feet deep without reaching the bottom of the deposit; the depth is as yet unknown. It is easy to see by using these figures and multiplying by the weight of a cubic foot of sulphur, which is over a hundred pounds, that this deposit contains easily ten million tons of sulphur. The poorest ore yet found in this locality contains 40 per cent. sulphur, and is almost black in colour; but as the 90 per cent. ore is inexhaustible the poorer ores are disregarded. These ores were analysed at Case School of Applied Science by a familiar process and found to be absolutely free from arsenic and antimony, which cannot be said of the imported Sicily sulphur. The sulphur in this deposit is in strata, measuring from eleven to twenty-two inches in thickness, and as it is a surface deposit it is worked much like the quarrying of stone. It is then refined by a new process, which consists of melting the sulphur, forcing and straining it through a cylinder by the heat and pressure of steam, and as the ore is only contaminated with lava sand, it is very easily separated.

In many parts of this deposit the vapours are still rising and the deposition is continuous. In sinking shafts the vapours are so intense that several workmen are required, for one man is soon overcome and another one must take his place; and often, birds and small animals enter the sulphur pits for shelter and are soon overcome and suffocated. In 1872, a party of business men endeavoured to find the extent of this deposit. On camping out the first night, their tents were filled with vapours and they were nearly suffocated; next day they started to sink a shaft, again the vapours drove them away and they had nothing to show for their trouble except a pair of sore eyes apiece. On their return they reported the discovery of the infernal regions in active operation. The way in which this deposit was discovered is a rather peculiar one: it was noticed at a certain time in the year, when the foliage of the trees was just beginning to appear, that wherever a tree was growing near a sulphur deposit it was greener and more advanced than the trees about it; knowing this fact, a single person was enabled to discover and locate fourteen deposits. This advanced growth was probably due to the warmth of the rising vapours. Soon after the discovery of these beds, some English capitalists sent over experienced men at a great expense, who, being ignorant of this fact, failed to make a single location.

A few years ago sulphur was discovered in Mount Humboldt, Nevada, which was 98 per cent. pure, but it proved to be only a "pocket" and was soon exhausted. Rich deposits were also discovered in New Mexico as well as in California and Colorado; in fact, at the Exposition at New Orleans, nearly all the western States reported sulphur deposits and exhibited specimens of the ore, but owing to lack of railroad facility or extent of the ore these deposits have not been operated to any degree.

The high rates of freight in the West have been a great drawback to the mining industries, and have compelled us to borrow of our neighbours when we have abundance at home. This is the case with our sulphur industries. We now import nine-tenths of our sulphur from Sicily. The ore there is taken from the bed of an extinct crater, several hundred feet below the surface, and is carried to the surface upon the backs of children. The ore does not average above 20 per cent. It is then partially refined and shipped to us as "crude sulphur;" this is done to avoid the duty on the refined article, and as it is shipped *free* as ballast it makes a cheap article with which American high-priced labour and freights will hardly allow of competition.

The great demand for sulphur is, of course, for the manufacture of sulphuric acid, and it would seem at first sight that it would be necessary to ship the western sulphur to the East and supply this demand, in order to make the enterprise a profitable one; this, plainly enough, would eat up the profits. But such is not the case, the demand for sulphur in the West is enormous and is steadily increasing, and will continue to increase as long as the population increases and new industries are started in operation. Sulphur is used largely in the West, espepecially in Colorado, New Mexico, and Texas, as a "sheep dip." This "dip" is composed of sulphur and an alkali, and is used for cleansing the sheep and destroying a kind of itch that is common in that locality. The carrying out of this cleansing is compelled by law. Little towns in the West, that are hardly noticeable on the maps and are almost unheard-of, purchase annually from five to ten carloads of sulphur. This sulphur is then sold to the various ranches in the vicinity and used as described. Sulphur, again, is largely used in restoring old vineyards, especially in California and that vicinity. It is also used in a variety of smaller ways that are well known in the East. The imports of this article in 1878 were 48,102 tons, and in 1886 were 117,538 tons, showing an increase of over sixty-nine thousand tons in the importation in eight years, and in the next eight years the increase of course will be much greater unless we bring our western sulphur into the market; and it will be brought into the market and will compete with the Sicily trade, just as sure as American energy and enterprise continues to be what it has been in the past.

* From the *Am. Journ. Pharm.*, January.

MANUFACTURE OF OIL OF SASSAFRAS.*

BY THOMAS C. HARRIS.

In some of the interior counties of North Carolina may be seen, in operation, many primitive establishments for the manufacture of the oil of sassafras and oil of pennyroyal. The apparatus used in this work is so exceedingly rude and primitive as to appear ridiculous to most observers; but the product is of good quality, and constitutes a profitable industry. For these oils the usual style of "still" may be briefly described as a short trench in the ground, ending in a low flue or chimney. Over this trench is placed a closed wooden box, having a sheet-iron bottom, and an auger-hole on top, through which water is poured. An ordinary barrel stands endwise on top of the steam-box, and has several holes bored through

* From the *Popular Science News*, November.

its bottom, and also through the top of the steam-box, allowing steam to pass freely up through the barrel. A lute of clay is used to close the joint between the lower end of the barrel and the steam-box, as well as the cover of the barrel. Instead of a "worm," a tin pipe immersed in a trough of cold water is used; and a steam connection with the barrel is generally made by an elbow branch of wood, bored out with an auger. The sassafras tree (*Sassafras officinale*) grows abundantly in this section (Raleigh, N.C.), especially on worn-out lands, where it is usually found in dense thickets of small shrubs. The root is dug and washed free of dirt, and, after being chopped short and bruised with a hachet, is ready for the "still."

When the barrel is filled with the roots, and the cover made tight with clay, the process of distillation goes on rapidly. The steam passes through the mass of bruised roots, and is condensed by the tin tube into a mixture of distilled water and oil, and runs into a glass vessel set to receive it. Being of different densities, the oil and water rapidly settle into two strata, and one can be decanted from the other. It is said that the operator of such a "still" can pay all running expenses and make a clear profit of three dollars per day.

The same outfit is used in the production of the oil of pennyroyal (*Hedeoma pulegiodes*), which grows abundantly in the woods in many counties.

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Thomas Spencer	0	10	0
John Spiller	1	1	0
J. Spilsbury	1	1	0
A. H. Squire	5	5	0
Peter W. Squire	5	5	0
F. Stacy	0	5	0
E. C. C. Stanford	2	2	0
R. S. Starkie	1	1	0
J. Stocken	5	5	0
John Stroud	0	10	6
C. E. Stuart	0	10	6
J. R. Summers	1	1	0
Francis Sutton	1	1	0
Charles Symes	3	3	0
Symes and Co.	3	3	0
W. H. Symons	3	3	0
G. S. Taylor	3	3	0
A. E. Tanner	2	2	0
T. Terry	0	10	0
H. Thomas	0	10	6
Horace Thomas	1	1	0
H. A. Thomas	2	2	0
H. Parry Thomas	0	5	0
R. Thomas	0	2	6
T. Rees Thomas	0	5	0
C. Thompson	0	10	6
G. Thompson	0	2	6
G. A. Thompson	0	10	6
H. A. Thompson	2	2	0
J. C. Thresh, D.Sc.	2	2	0
E. A. Thrower	0	10	6
Professor C. R. C. Tichborne, LL.D.	1	1	0
Professor Tilden, D.Sc., F.R.S.	1	1	0
J. G. Tingle	0	5	0
C. Tomlinson, F.R.S.	1	1	0
C. E. Turner	1	1	0
C. Virgo	2	2	0
C. Wakeham	0	5	0
W. Ward	1	1	0
Charles Walker	0	5	0
Henry Walker	1	1	0
D. Wallworth	0	10	6
W. P. Want	0	5	0
W. Warren	0	10	6
F. W. Warrick	1	1	0
G. E. Waterall	1	1	0
J. Watts, M.A., D.Sc.	5	0	0
J. N. Watts	1	1	0
W. Manning Watts	3	3	0
E. A. Webb	2	2	0
Sir Spencer Wells, Bart., F.R.C.S.	2	2	0
J. L. West	2	2	0
J. T. Westover	0	5	0
W. Whysall	1	1	0
H. J. Wigg	2	2	0
H. Wiggins	0	5	0
J. Wild	0	10	6
W. Wilkinson	0	10	6
E. Williams	0	5	0
John Williams	10	10	0
W. Willmott	1	1	0
Albert Wilson	0	5	0
R. E. Wilson	0	10	0
J. A. Wine	0	10	6
G. S. Woolley	5	0	0
H. Woolley	5	0	0
A. Wright	0	10	6
H. C. Wright	0	2	6
Wright, Layman and Umney	5	5	0
W. F. Wyley	3	3	0
Frederick Wynn	0	10	0
Francis Yates	2	2	0
J. Rymer Young	1	1	0
R. Fisher Young	1	1	0
W. C. Young	0	10	6

From Australasia.

A. Andrews (Beaufort)	0	10	6
C. A. Atkin (Hotham)	0	10	6
B. Baker (Richmond)	0	10	6
D. R. Blackett (Fitzroy)	0	10	6
W. Bowen (Melbourne)	0	10	6
H. Brind (Ballarat)	0	10	6
J. Brinsmead (St. Kilda)	0	10	6
F. P. Cheqwidden (South Melbourne)	0	10	6
W. Colledge (Geelong)	0	5	0
F. H. Cooper (Geelong)	0	5	0
S. M. Dalton (Prahran)	0	10	6
H. A. Dorinaldi (Prahran)	0	10	6
J. R. Duerdin (Melbourne)	0	10	6
J. D Evans (Collingwood)	0	10	6
A. R. Fowler (Launceston, Tasmania)	1	1	0
H. Francis (Melbourne)	0	10	6
R. P. Francis (Melbourne)	0	10	6
R. J. Fullwood (Melbourne)	0	10	6
R. Gabriel	0	2	6
H. Gamble (Prahran)	0	10	6
F. S Grimwade (Melbourne)	0	10	6
H. Guthcil (Melbourne)	0	10	6
C. Harrison (Prahran)	0	10	6
C. E. Hirst (West Melbourne)	0	10	6
E. G. Hooper (Melbourne)	0	10	6
T. Huntsman (Fitzroy)	0	10	6
W. Johnson (Windsor)	0	10	6
G. Kingsland (Melbourne)	0	10	6
J. Lacey (Melbourne)	0	10	6
T. Longstaff (Ballarat)	0	10	6
J. B. L. Mackay	0	10	6
C. Marston	1	1	0
A. H. Massina (Melbourne)	0	10	6
J. V. Morgan	0	10	6
G. Morrow (Geelong)	0	5	0
T. H. Naylor	0	10	6
W. Y. Nelson (Prahran)	0	10	6
J. H. Nicman	1	1	0
A. J. Owen (Geelong)	0	10	6
J. Owen (Geelong)	0	10	6
T P. Palmer (Ballarat)	0	10	6
H. W. Potts (Melbourne)	0	10	6
C Pleasance (Melbourne)	0	10	6
W. M. Rogers	0	5	0
W. M. Rowley (Melbourne)	0	10	6
J. W. Scott (Ballarat)	0	10	6
H. Shillinglaw (Melbourne)	0	10	6
J. G. Smith (Carlton)	0	10	6
S. S. Strutt (East Melbourne)	0	10	6
G. Swift (Melbourne)	0	10	6
J. T. Thomas (Melbourne)	0	10	6
J. D. Thompson (Melbourne)	0	10	6
H. T. Tompsitt (Melbourne)	0	10	6
Dr. Treaver	0	5	0
G. E. Treen (South Melbourne)	0	10	6
C. Wallis	0	10	6
T. H. Walton (Fitzroy)	0	10	6
A. Wallworth (South Melbourne)	0	10	6

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 19, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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CONSUMPTION OF DRUGS IN ST. BARTHOLOMEW'S HOSPITAL.

IN a very interesting paper published by Dr. W. S. CHURCH in a previous volume of Saint Bartholomew's Hospital reports, an account was given of the early history of the dispensing department of the hospital, or the apothecary's shop, as it was termed, and also of the earliest Hospital Pharmacopœia, discovered by Dr. MOORE among the manuscripts of Dr. EDWARD BROWNE, dated 1670. His review of the subject was then brought down to the year 1739, when another Hospital Pharmacopœia was published, and an abstract of the paper appeared in the *Pharmaceutical Journal* of April 4th, 1885. Dr. CHURCH has now resumed his historical account of the Hospital Pharmacopœia and Apothecaries' Shop at Bartholomew's by tracing their further progress from the year 1746, and at the outset he recalls to mind the reformation which took place in English pharmacy during the twenty-five years that elapsed between the publication of the fourth edition of the London Pharmacopœia in 1721 and of the fifth in 1746. While pharmacy up to that period had followed the old traditional lines adhered to since the days of HIPPOCRATES, GALEN and the Arabian physicians, and the learned colleges had remained subject to the superstitious element which played so great a part in the medicine of the Middle Ages, a very beneficial change was produced by the courageous action of the Committee of distinguished men appointed to prepare the fifth edition of the London Pharmacopœia, in sweeping away many of those "inartificial and irregular mixtures which the ignorance of the first ages introduced," as well as most of the disgusting substances, "for the most part superstitiously and doatingly derived from oracles, dreams and astrological fancies," which up to that time disfigured our Pharmacopœias. As an amusing instance of the belief in magic that then prevailed even among the learned, Dr. CHURCH gives the following quotation from PEPY'S Diary, January 30, $16\frac{64}{65}$. "Homeward on my way, buying a hare and "taking it home, which arose upon my discourse "to day with Mr. BATTEN in Westminster Hall, who "showed me my mistake, that my hare's foot had "not the joynt to it; and assures me that he never "had his colique since he carried it about him; and "it is strange how fancy works, for I no sooner "handled his foot but I became very well, and so "continue." And the next day he ends his entry thus:—"Now mighty well, and truly I can but impute it to my fresh hare's foot."

These entries by a man so matter-of-fact and unimaginative as PEPY'S serve to illustrate the manner in which the use of charms was regarded much in the same doubtful, but half credulous way that many now speak of homœopathy and spirit rapping. But great and radical as were the changes made by the London College in 1746, the belief in some of the old formulæ and mysterious drugs was still too strong to admit of such preparations as Mithridate or Damocrates confection and Theriaca Andromachi, or Venice treacle being expunged, any more than the bezoar of which PEMBERTON, in speaking of pulvis è chelis cancrorum compositus, remarked "that being a costly material it "is for the most part clandestinely left out of this me-"dicine upon supposition that physicians do not in "every instance where this powder is described de-"pend, in any particular manner, upon this express "ingredient." The accurate dispensing of physicians' prescriptions would not therefore appear to have been a *sine quâ non* with the pharmacists of that period, and the complexity of many of the common medicines must have afforded some inducement for omission or substitution, as was the case with Mr. LAVEMENT in 'Roderick Random,' who was described by SMOLLETT, probably from his own experience, as being so expert at a succedaneum as without the least hesitation to make up a physician's prescription though he had not in his shop one medicine mentioned in it. "Oyster shells he could con-"vest into crab's eyes; common oil into oil of sweet "almonds; syrup of sugar into balsamic syrup; "Thames water into aqua cinnamomi; turpentine "into capivi, and a hundred more costly prepara-"tions were prepared in an instant from the cheapest "and coarsest drugs of the materia medica."

Another very interesting part of Dr. CHURCH'S paper relates to a later period, and reviews the increase in the number of patients in Bartholomew's Hospital during the last fifty years, as well as in the corresponding rise in the consumption of some of the more important of the drugs used in their treatment. These statistics have been obtained by Mr. JEFFS, the dispenser, from the shop-ledgers which have been kept with scrupulous exactness since the year 1836. They show not only the quantities of drugs received, but also the exact date at which any remedy was first used in the practice of the establishment, and how they bore the test of trial in the unfashionable and perhaps sceptical air of the hospital. As it is not a little remarkable to note the steady, and in many instances rapid increase in the use of preparations which have

eventually stood the test of time, and proved themselves of real value in the treatment of disease, while others soon fell into oblivion, we purpose making some extracts from Dr. CHURCH'S records. Sulphate of magnesia is the drug that is used in the largest quantities in the practice of the hospital, and it is principally consumed in the two preparations Hst. Sennæ Co., and Hst. Menthæ Sulph. c. Mag. Sulph. The very great increase in the last thirty years over the preceding twenty, 120¾ cwts. against 43¼ cwts., may be taken as a measure of the increase in the out-patient and casualty departments, other circumstances being taken into account. Taking the ordinary dose at half an ounce, the quantity consumed gives the enormous number of 340,480 doses dispensed in the course of a year of this drug alone. The manufacture of this salt from dolomitic limestone was not known until the beginning of this century, and its extensive use since then has been partly due to its cheapness. During the last century, the purgative waters in the neighbourhood of London were largely used, and Dr. CHURCH suggests that it would be an interesting arithmetical calculation to find how many hogsheads of them would equal the quantity of magnesium sulphate now annually used in the practice of Bartholomew's Hospital alone. Linseed meal and lint are articles which forcibly illustrate the increase of the hospital work. At the commencement of the century, reference was frequently made in the minutes of the Shop Committee to the large and increasing quantities of linseed meal used, and to disputes as to price and quality. In 1836, the quantity was 8¾ tons; in ten years this had risen 11½ tons, and remained at that until about 1865, since which time it has gone on increasing, so that the average for the last ten years has been 15¾ tons. The increase in the consumption of lint is still more remarkable, for while 809 lbs. sufficed in 1836, no less than 4579 lbs. were required in 1885, notwithstanding the quantity of antiseptic dressings now used. The cost of the latter for the year ending Michaelmas, 1885, was £409 14*s.* 9*d.* The statistics of mercurial preparations could not be satisfactorily ascertained, since the hospital sometimes bought them ready made, and sometimes manufactured them. The maximum consumption of leeches was in 1837, when 96,300 were used; the consumption then declined until in 1868 it was 2200; since then the average has been 1770, and Dr. CHURCH considers that leeches are not nearly so much used now as they ought to be for the relief of pain.

Among the more important medicines, bark and its preparations first appear in the Hospital Pharmacopœia of 1739, but Dr. CHURCH is of opinion that Dr. E. BROWNE had used it fifty years before. In the pharmacopœia of 1764, there are only two formulæ for preparations of bark, tincture and decoction; in that of 1799 there are two formulæ for infusion; in that of 1803 there is a compound infusion, and a liquor as well as a liquor quininæ sulphatis. During the last fifty years the consumption of bark has been very fluctuating, and it is now very much less than it was twenty years ago, notwithstanding the great increase of out-patients. This decrease cannot be accounted for by the greater use of quinine, since the quantities of that drug used have varied in the same way. Dr. CHURCH suggests that the use of quassia may have something to do with it, since the increase in the consumption of quassia is very startling. From 1836 to 1846 it appears to have been used only to the extent of 60 lbs. After 1844 the average yearly consumption rose from 6 lbs. to 506 lbs. between 1866 and 1875, and the drug is still very largely used in the shape of Hst. quassiæ c. ferro. The quantity of quinine used between 1836 and 1845 was on the average 143 ounces yearly, and it has increased until in the last ten years it was 1123 ounces a year. Dr. CHURCH has been unable to ascertain when bromide and iodide of potassium were first used in the hospital, but they appear in the ledger for 1836 in small quantities, and for the last twenty years bromide has been used to the average extent of 146 lbs. between 1866 and 1875, since then to the extent of 347 lbs. yearly. The consumption of iodide has increased from an average of 105 lbs. between 1836 and 1845 up to 463 lbs. between 1876 and 1885. This is one of many instances in which a really valuable drug rapidly found favour in hospital practice. The increase in the consumption of bromide of late years is mainly due to the use of it in the casualty department introduced by Dr. BRUNTON.

Cod-liver oil was slow in finding favour even after 1841, when Dr. HUGHES BENNETT wrote upon it, the first entry upon the ledger being in 1846. In the following year 17 gallons were used, and in 1849 the consumption rose to 140 gallons, probably in consequence of the favourable account of its value in phthisis in the medical report of the Brompton Hospital. Since then the consumption has increased, until the average for the period from 1876 to 1885 was no less than 1368 gallons a year. Ergot, which has given rise to so much difference of opinion, did not come into use with English practitioners until after 1828, and its first appearance in the hospital ledger was in 1842, when a quarter of a pound was ordered. The average consumption from 1851 to 1861 was only about 1¼ lb. Since then its use has increased so enormously that from 1861 to 1870 the average quantity of the liquor used was 27½ lbs.; from 1870 to the present time it was 146 lbs. Since 1877, the consumption has fallen, possibly in consequence of the introduction of ergotine, and during the last sixteen years the use of the powdered drug has been discontinued. The first appearance of chloroform in the ledger of the hospital was on November 22, 1847, just a week after the appearance of Sir J. Y.

Simpson's pamphlet on its use in surgery and midwifery. In 1848 the consumption was 17 lbs., and it did not rise above 24 lbs. until 1855, when it was 59 lbs. During the last ten years the average consumption has been 286 lbs. The first appearance of chloral hydrate was in 1870, and it seems to have gained favour at once, having been used in the first two years nearly as largely as now; then it declined for a time, and the average consumption of the last twelve years has been 17 lbs. or 18 lbs. a year.

Croton chloral hydrate appeared first in 1872, but it has never been much used, the average consumption having been about 7½ ounces a year. Strychnine, which appeared first in 1836, and was introduced into the London Pharmacopœia in 1850, was not much used until 1870, and during the last fifteen years the average consumption has been 4 ounces yearly. Both the acetate and hydrochlorate of morphine are met with in the ledger of 1836. During the last fifty years the average consumption of the acetate has increased from 6·4 ounces to 19·8 ounces, that of hydrochlorate from 1·1 ounce to 15·1 ounces; but during the last ten years, although the number of patients has been greater than ever, there has been a very great decrease in the use of morphine, owing in all probability to the substitution of chloral as a hypnotic. The first entry of atropine is in 1861, and the sulphate does not appear to have been used until 1868; since then the use of both has increased, partly owing to the development of the ophthalmic department, until the average consumption has been 3·5 ozs. of atropine and 2·4 ozs. of sulphate. Glycerine, which first appeared in the hospital ledger in 1852 to the extent of 32 lbs., has gradually come into use to the extent of 2303 lbs. a year. The first entry of carbolic acid was for 5 lbs. in 1865, and in the following year of 1¾ lbs. was bought; but since then the consumption has risen to 1267 lbs. a year, independent of that used for disinfecting purposes. Iodoform was first introduced into the practice of the hospital in December, 1875, and two ounces were then ordered, the next year 4 ounces, and the year after 4·75 lbs. In 1884 the consumption had risen to 115 lbs., and in 1885 it was 90 lbs. The first entry of salicylate of soda was for 25 lbs. in 1877, next year the consumption was 46 lbs., and since then it has averaged 75·3 lbs. The increase in the use of vaseline since its introduction in 1878 is, perhaps, the most remarkable, the consumption having risen from 20 lbs. to no less than 3257 lbs. in 1885, and that without any corresponding decrease in the consumption of lard, which is still used, for making zinc, sulphur and white precipitate ointments, to the extent of about one ton and a half annually, sufficient, as Dr. Church suggests, to keep the neighbourhood of Bartholomew Hospital tolerably free from parasitic life.

THE REDWOOD TESTIMONIAL FUND.

At a meeting of the Executive Committee, held on Wednesday, February 9, the President of the Pharmaceutical Society in the chair, the Honorary Secretary (Professor Dunstan) announced that rather more than £800 had been subscribed, from which amount the working expenses had to be deducted. A discussion took place as to the best method of dealing with the balance in accordance with the resolutions which had been passed at a previous meeting. On the motion of Dr. Langdon Down, seconded by Mr Atkins, it was resolved "That about £600 "should be invested for the foundation of a Redwood "Scholarship to be held in connection with the "School of Pharmacy of the Pharmaceutical Society, "and that the surplus be expended in painting a "portrait of Professor Redwood to be placed in the "House of the Society." A Committee consisting of the President of the Pharmaceutical Society (Mr. Carteighe), Mr. John Williams, Mr. Walter Hills, Dr. Langdon Down and Professor Dunstan were appointed to carry this resolution into effect, and to report at a subsequent meeting of the Committee. A complete list of the subscribers to the Fund will be found in another part of this Journal.

We learn from Mr. Haydon that the amount of the donations to the fund for carrying on the work of the Chemists and Druggists' Association until the 30th of June next is now upwards of £400.

* * *

The *Sanitary Engineer* reports a series of occurrences, which illustrate forcibly a danger that may attend the use of an odourless gas for economic purposes. It appears that in Troy, N.Y., an odourless fuel gas has been supplied by a public company, and has been used to a considerable extent for heating and cooking in hotels, restaurants and similar establishments. Some weeks since, half a dozen workpeople in a laundry were suddenly prostrated, suffering from chills and headaches and becoming quite helpless. Medical aid was called in, and under the influence of restoratives and fresh air they revived; but in the meantime it was found that a stop-cock had been left partly open and that the fuel gas had been escaping into the room. A few days subsequently, three men employed in a restaurant suffered from a similar cause. Then the manifestation took a still more alarming character, about a dozen persons, employed in different stores, being attacked, the supposition being that in these cases the gas had made its way unnoticed into the stores through a leaky main. These occurrences are likely to originate a crop of law-suits against the company supplying the gas.

* *

Having met with a specimen of "potash alum" which was considerably less soluble than the requirements of the German Pharmacopœia, Herr Salzer was led to suspect an admixture of rubidium or cæsium alum, due to the sample having been prepared from lepidolite. An examination by means of the spectroscope confirmed the suspicion. Herr Salzer points out that naturally cæsium alum can only be present in small proportion, but he adds that at least 25 per cent. of rubidium alum would be required to explain the difference from the normal solubility observed.

Provincial Transactions.

NORTH OF ENGLAND PHARMACEUTICAL ASSOCIATION.

A meeting of members and associates was held on Thursday, February 10, at 8 p.m., in the rooms of the Association, St. Nicholas Chambers, Newcastle-on-Tyne. In the absence of Mr. N. H. Martin, President, Mr. J. B. Payne was voted to the chair.

Mr. B. S. Proctor, Vice-President, then read a highly interesting and instructive paper on "Pharmacopœial Testing," and during the course of a lengthy reading touched upon many points of importance to pharmacists, concluding by a demonstration of spirit of nitrous ether. The paper will be found at p. 665.

On the motion of Mr. A. Wright, seconded by Mr. J. B. Payne, a hearty vote of thanks was accorded to Mr. B. S. Proctor.

A vote of thanks to the Chairman terminated the meeting.

DOVER CHEMISTS' ASSOCIATION.

The quarterly meeting of the above Association was held on Wednesday evening, February 9, the President in the chair.

After the usual routine business had been disposed of, the following paper was read:—

Bitter Aloes: A Confession of Bewilderment.

BY J. F. BROWN.

Almost the first step in an alphabetical progress through materia medica brings the student face to face with the numerous contradictions which cluster round the subject of this paper, making it appear almost an insoluble conundrum.

You will be relieved to hear that I shall pass by all questions of botanical origin or of chemical formulæ, and consider only those others which have been suggested by a collation of the statements *ad rem* published in the *Pharmaceutical Journal* at different times, and contained in a few standard authorities. All these agree that the drug is the inspissated juice which has exuded or been pressed from superficial vessels in the leaf, and that the different varieties fall naturally into two classes, of which Socotrine and Barbadoes are convenient types.

With the single but weighty exception of the late Peter Squire, all represent the first class as usually prepared by solar heat, the second by artificial evaporation. There is a consensus of opinion on the solitary point that the latter process is injurious to the quality of the drug, which is, however, unsupported by facts. On almost every other point there is an amusing see-saw of learned evidence, worthy of the famous trial at law of the simple question—what is coal?

Thomson ascribes the superiority of Socotrine aloes to the greater proportion of extractive contained therein. Squire gives the proportions of extract as 75 per cent. and 50 per cent. for Barbadoes and Socotrine respectively.

Squibb ascribes the more drastic nature of Barbadoes to its having been prepared by boiling; but it is questionable whether the two classes differ essentially in their operation, or merely in degree, needing only readjustment of doses to overcome it. A more important question, indeed the cardinal point in discussing the therapeutics of aloes, is, whether aloin is the true active principle or measure of value of the drug. In spite of the boiling, it is the Barbadoes variety which has generally been used as the source of this principle. Tilden, however, regards Barbaloin, Socaloin and Nataloin as unmistakably different substances. In the hands of Plenge, Tilden's process gave yields of 3 per cent. from Socotrine and 9 per cent. from Barbadoes respectively. An alternative process, in which Socotrine was treated by boiling in alcohol for two hours, gave 10 per cent. of aloin; but it is difficult to reconcile this method of separation with Squibb's statement that, with the exception of about 6 or 7 per cent of impurities, the whole of the drug is soluble in alcohol.

Tilden considers that all varieties owe their bitterness to the aloin they contain, and he obtained 20 per cent. from Barbadoes by treating it as for extract, evaporating the liquid resulting from 1 lb. of aloes to 32 fluid ounces, which must consequently have been a 10 per cent. solution of aloin.

Craig states that aloin constitutes 25 per cent. of aloes, yet Mitchell obtained only between 8 and 9 per cent. from Barbadoes, and oddly enough, states that the residual liquid from 1 lb. yielded 10 ozs. of "very good" extract

It appears then that the boiling, which is so strongly deprecated both in obtaining the crude drug and in making its galenical preparations, is consistent with a larger yield of aloin and greater purgative power in the aloes so prepared.

Most curious is it also to note that while the sun-dried Socotrine is generally regarded as the standard quality, and described by Tilden and Rammell as consisting mainly of crystallized aloin with some resinoid, the authentic specimen procured by Professor Balfour, when examined by Dott, yielded only 2 per cent. of the former to 55 per cent. of the latter, and was regarded as more historically interesting than medicinally valuable.

If the reason for this be sought for in the fact that it had been kept for three years, we are confronted by the statement of Tilden that aloin is not easily decomposed by heat in neutral or slightly acid solution, which latter condition is stated by Branson to be natural both to the juice of the leaf, and an aqueous solution of the drug; also by the well-known practice of storing a certain variety of aloes, whereby it is believed greatly to improve. Prolonged exposure to moist heat is said by Tilden to convert aloin into a brown substance, called by Craig "changed" aloin, and stated by him to retain its therapeutic activity, since numerous experiments on human beings and rabbits showed that 1 or 2 grains acted as a mild aperient. So that Aitken's complaint of the injury done to the extract by the employment of steam heat in its preparation seems hardly well founded.

Royle and Headland state that aloin heated to 212° F. is rapidly oxidized and decomposed, but Tilden considers the presence of alkali essential to rapid oxidation, and notes that potassium carbonate is specially conducive to this change.

In Paris's 'Pharmacologia' it is held that the purgative property of an alkaline solution diminishes, *pari passu*, with the bitterness; Branson remarks that the decoction becomes less purgative by keeping, and Tilden states that the oxidized and tasteless alkaline solution has no effect, but W. Young found that the varying degrees of bitterness did not affect its aperient activity. My own very limited experience leads to a doubt whether a sample of concentrated decoction, which from keeping has ceased to be unbearably nasty, is therefore necessarily inefficient.

Cathartic remedies excel most others in the completeness with which their action is demonstrated; that such clouds of doubt, therefore, obscure the truth with regard to one of the best known of this class lessens our wonder at the virtues alternately affirmed and denied to belong to those whose working is less palpable.

The uncertainty as to the dose of aloin will illustrate my meaning. T. and H. Smith state the relative proportion as 1 to 5 of aloes; but Tilden took ½ to 1 grain without effect, although it does not appear that he controlled the test by taking 5 grains of aloes. Dr. Craig gives the dose as ½ to 1 grain, the B.P. ½ to 2 grains, Squire 1 to 2 grains, Mitchell 1 to 3 grains, and Martindale 1 to 4 grains. Stillé and Maisch regard aloin as probably two or three times as active as good aloes, and quote Dr. Harley to the effect that 1½ grains will produce two or three copious evacuations in a strong adult, and that 2½ grains are a powerfully cathartic dose.

This is rebutted by Dobson and Tilden's published

record of fifty cases, principally adult males, in which all three kinds were given in doses not exceeding 2 grains, with effect described as "slight and very uncertain."

Barbaloin, especially with soap, appeared slightly the strongest of the three, but Nataloin in 6-grain doses failed to act in some, in other cases acted freely in smaller dose. The authors conclude that aloin acts as well as an equal dose of aloes and gripes less. By A. P. Brown aloin is considered not more active than an equal dose of aloes, and the resin inert, while Proctor's personal experience is that aloes, aloin, uncrystallizable extract and insoluble portion all acted equally well.

That the solubility of aloin in water should be variously stated as 1 in 60, 1 in 90, and 1 in 500, and as insoluble—freely soluble—soluble 1 in 30 of alcohol—is only part of the puzzle.

It is agreed that the resin is very uncertain when used hypodermically, but Tilden and Craig take diametrically opposite views as to whether it is "changed" (possibly dehydrated) aloin, or something essentially different. The latter gave 8 grains with good effect, but 12 grains of a sample specially prepared free from aloin by Messrs. Smith failed to operate. Craig's own process consisted in dissolving well-washed resin in spirit, and precipitating by the addition of boiling water. Fifteen per cent. of the product was insoluble in spirit, and gave 23 per cent. of ash. It is known that the insoluble part of aloes is to some extent rendered soluble by prolonged contact with hot water, but this experiment points to such treatment rendering that insoluble in alcohol which had previously dissolved.

The successful hypodermic administration of aloin seems to render needless the elaborate building up of those composite pill structures, with casings of various degrees of solubility, which were recently recommended.

Would it be too much to ask some competent student of therapeutics, if the ever-rising flood of novelties will permit, to try and throw some light upon the action of this old and familiar drug. My own diffident guess is that when submitted to the process of digestion, and especially to the eminently solvent properties of the bile; the whole of the drug, save only the desert sand, and comminuted monkey skin casually and occasionally accompanying it, is capable of producing its well-known benign effect.

Owing to the lateness of the hour the subject was not discussed.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

On Friday evening, the 11th inst., an examination of the students attending the pharmacy class of the above Association was held in the Sunday School Institute, Shakespeare Street. The examination was conducted by Messrs. W. Widdowson, H. Thacker and W. Gill, in a similar manner to the Minor, and was the second of a series to be held during the session, in order to test what progress has been made by the students and to familiarize them with the nature of the pharmaceutical Minor. Fifteen students attended, and eleven of these presented themselves for examination. As only three students could be examined at once, the remainder, while waiting their turn, inspected the contents of the Museum of the Association, and a number of materia medica specimens lent for the occasion.

These examinations are found to be an agreeable change from the routine of the pharmacy lectures, and are much appreciated by the students, especially the older ones. The class is held every Friday evening at 9.15, and has, so far, been very successful, there being eighteen names on the register, and an average attendance of fifteen.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The monthly general meeting was held at the Society's Lecture Room, Norfolk Row, on Wednesday evening the 8th inst., when a paper was read by Mr. Thomas Dobb, pharmaceutical chemist, on "Organic Analysis with special reference to the Analysis of Oils."

A vote of thanks for the paper was unanimously passed.

The Secretary announced the donation to the library, of the Register 1887, and the Calendar of the Pharmaceutical Society, 1887, from the Pharmaceutical Society of Great Britain.

New members were elected.

TORQUAY CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held on Tuesday, the 8th inst., Mr. T. Horton, M.P.S., in the chair.

The minutes of the previous meeting having been read and confirmed, the debate on "Dispensing Difficulties," which because of its interest and helpfulness had been adjourned from the last meeting, was resumed and concluded.

One of the prescriptions presented involved the dispensing of 30 minims of oil of cubebs in twelve pills, and much merriment and assumed indignation was excited by the suggestion of a member that it would be best to make up a good firm mass with liquorice powder and magnesia, and then "weigh off" a sufficient quantity.

Mr. T. Colebank then read a paper on "Glycerine." He mentioned that glycerine was discovered in 1779 by Scheele, who obtained it from lead plaster, and named it sweet principle of oil, and that it was found in almost all fats and oils to the extent of 8 or 9 per cent. A description of the various methods for obtaining glycerine was then given, the p incipal being:—(1) by the saponification of oils by means of oxide of lead; (2) from soap leys; (3) By passing superheated steam at a temperature of 500° to 600° F. through melted fats. The various properties were then enumerated, antiseptic, hygroscopic, solvent etc.., and the peculiar products of decomposition if distilled without due precaution. The essayist went on to speak of the many uses of glycerine, as an application to the skin in the form of cosmetics, jellies and the like, as a lubricative for chronometers, as an essential ingredient of copying-inks, and as an adjuvant in the mounting of botanical and zoological specimens. The preparations of the B.P. containing glycerine were then given and criticized. It was suggested that the further addition of water up to 25 per cent. to glycerinum tragacanthæ would prevent further absorption and improve the preparation. The paper concluded with the mention of possible impurities, such as sugar, glucose, gum, dextrin, lime, lead and butyric and formic acids, and several tests for the detection of each were given.

In the discussion which followed, Messrs. Ness, Curtis, Bathe and March, and the Chairman took part.

Votes of thanks to the essayist and the Chairman closed the proceedings.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At a meeting of the Chemical Society, held on Thursday, February 3, Dr. Hugo Müller, F.R.S., President, in the chair, several certificates were read for the first time, and the following were elected Fellows of the Society:—Messrs. W. H. Coates, T. Cooksey, A. H. Downes, M.D., H. Emmons, G. A. Goyder, E. Hori, H. McKeow, J. F. McArthur, D. H. Nagel, T. B. Reay, C. E. Sohn, Junr., L. W. Stansell, J. P. Strangman, D. A. Sutherland, Jokichi Takaminé.

The following papers were read:—

The Absorption of Gases by Carbon. By CHARLES J. BAKER.—A series of experiments are described in which carbon in the form of animal charcoal, previously heated *in vacuo*, was saturated with oxygen, both dry and moist, at a low temperature; the carbon thus treated, enclosed in a vacuous tube, was then heated for some time at 100°, and finally the absorbed gas was extracted and analysed. Using moist oxygen it was found that no gas was given off at 12° from the carbon which had been exposed for one hour at −15° in such an atmosphere; on heating the carbon thus treated at 100° during seven days, and then exhausting at this temperature, it gave about seven times its volume of gas consisting of carbon dioxide. No carbon dioxide was produced on digesting carbon and water vapour for a similar period and then exhausting. Using dry oxygen and proceeding similarly, no gas was given off from the charcoal at 100°; however, on raising the temperature to about 450° gas was expelled, consisting mainly of carbon monoxide mixed with carbon dioxide. Dried carbon was then charged with dried carbon dioxide, and the gas was extracted by heating at about 450° as before; it consisted of carbon monoxide and dioxide, the proportion of the former being less the more carefully the carbon was dried. The author therefore concludes that the more carefully moisture is excluded the less does the carbon burn in the carbon dioxide which it absorbs; and further, that carbon is burned directly to carbon monoxide by absorbed oxygen.

Mr. F. J. M. Page asked whether the author had ascertained if the same carbon could be used repeatedly; that is to say, was it possible to burn away the whole of the carbon, or was the action confined to the surface.

Professor Odling, who had communicated the paper, said this had not been ascertained; he thought, however, it was probable that the carbon would become less and less absorptive, but that the action would continue in proportion as absorption took place.

An Explanation of the Laws which govern Substitution in the case of Benzenoid Compounds. By HENRY E. ARMSTRONG.—Certain mono-derivatives of benzene, especially those containing a hydrocarbon radicle, one of the halogens, hydroxyl or amidogen yield a mixture of the para- and ortho-di-derivatives in proportions which vary both according to the nature of the compound dealt with and of the reagent, and the conditions under which the change is effected; and if produced at all the meta-derivative is formed in but a small proportion. If, however, the radicle present in the mono-derivative be

$$NO_2,\ COH,\ CO_2H,\ SO_3H,$$

the meta-di-derivative appears invariably to be the chief product. Hitherto no explanation of this difference in the behaviour of the two series of mono-derivatives has even been suggested. In seeking to arrive at an explanation it is necessary to form a clear conception of the manner in which "substitution" is effected. The author is of opinion that in the first instance an additive compound is formed; and he points out that Kekulé has long since insisted in the plainest terms on this interpretation of changes of so-called double decomposition. He is inclined to believe that the tendency of negative to attract and combine with negative elements—to which he has of late frequently directed attention—is the effective cause; and that the additive compound is formed from those mono-derivatives which obey the "para-ortho law" by the fixation of the reacting molecule upon the carbon-atom which carries the radicle: separation of water or halogen hydride ensuing thereon, the radicle of the reacting molecule assumes the place either of an ortho- or of a para-hydrogen atom. It is easy to understand the formation of the ortho-di-derivative, as the hydrogen atom displaced is associated with a carbon atom contiguous to that to which the reacting molecule attaches itself. The formation of the para-compound is attributed by the author to the tendency towards symmetry, so frequently evidenced in cases of isomeric change and in other ways by benzenoid compounds; and not to the existence of any direct connection between carbon-atoms relatively in the para-position. The formation of meta-derivatives is believed by the author to result from the addition of the reacting molecule not to the carbon-atom of the benzene-ring but *to the radicle*, which in the mono-derivative is attached to one of the carbon-atoms of the ring; he is, however, of opinion that in order to explain why the additive compound thus constituted yields a meta-di-derivative, it will be necessary to obtain further information regarding the "dynamics" of such changes.

Professor Odling observed that any attempt to solve the problem of the action of the commonly employed reagents, chlorine or bromine, nitric acid and sulphuric acid on one set of phenic mono-derivatives to produce under ordinary conditions mainly para-di-derivatives, and on another set of phenic mono-derivatives to produce mainly meta-di-derivatives, was entitled to a thoughtful and grateful consideration. But in his opinion a distinction should be drawn between the abstract cause of the result—as when Professor Armstrong attributed the habitual preferential formation of para derivatives to the existence of a tendency to the formation of symmetric compounds, and the mechanism leading to the result—as when he represented the formation of ortho-derivatives as being an almost necessary consequence of the particular process by which he conceived the substitution to be effected. The former suggestion did not appear to help the matter forward very much; but the latter suggestion was at any rate in the nature of a real explanation: though, for himself, he was not prepared to admit the general principle that the previous combination of reagents was an invariable and determining condition of their reaction. Under exposure to bright daylight, a mixture of equal volumes of chlorine and marsh-gas, for instance, reacted even with violence; and, in his opinion, while the evidence as to the fact of their previous combination was of the smallest, the evidence as to the previous combination being the determining condition of the reaction was none at all. Admitting, however, that in the case of phenic reactions a previous combination took place in the particular manner so ingeniously conceived by Professor Armstrong as favouring the production of ortho-compounds, the general question, exemplified in the special case of the nitro-bromo-derivatives, for instance, why, starting from the mono-bromo-derivatives we should get mainly a para-di-derivative instead of an ortho-di-derivative, and why, starting from the mono-nitro-derivative we should get mainly a meta-di-derivative rather than either a para- or an ortho-di-derivative, still remained a problem, and one of very great interest, towards the solution of which Professor Armstrong had, at any rate, made a serious advance. It was clear that the nature of the product depended a good deal on the conditions of, and modes of effecting, the reaction; but having regard to the usual modes of experimenting, he was accustomed to point out that where the pre-existing radicle was one of the typical radicles formulated as Cl, OH, NH_2, and CH_3, respectively, or some closely related radicle, the tendency was to the formation of 1—4 di-derivatives; and that where the pre-existing radicle was one of the acidic radicles formulated as NO_2, SO_3H, and CO_2H, or some allied radicle, the tendency was to the production of 1—3 di-derivatives. Having regard to the want of absolute concordance even in the writings of the present day, and to the extreme confusion in the writings of the last twenty years, as to the attribution of the prefixes para-, ortho- and meta-, he preferred to speak of the different sets of compounds as 1—4, and 1—2 and 1—3 derivatives respectively. At the same time the expression of the primary 1, in each case, was for the most part superfluous, and might be omitted with advantage; only, to avoid confusing the other numerals with multiples, it was preferable to denote them by means of the small Roman or italic figures used by doctors when writing their prescriptions, instead of by

the usual Arabic figures. Thus while speaking of the two liquid dibromobenzenes, or as he preferred to call then dibromo-phenoenes, as one-two, and one-three dibromophenoene respectively, he was accustomed to write and formulate them as ij-dibromo-phenoene or ij-$C_6H_4Br_2$, and iij-dibromo-phenoene or iij-$C_6H_4Br_2$, respectively, the so printed names and formulæ being much shorter and clearer than those usually employed. These expressions, moreover, stand in direct relation to the facts that ij-dibromo-phenoene gives origin to two tribromo-derivatives, and that iij-dibromo-phenoene gives origin to three tribromo-derivatives. As regards the expression of the 1—4 or crystalline dibromo-phenoene, he was accustomed to write and formulate it as jv-dibromo-phenoene, or jv-$C_6H_4Br_2$; but it might be very well expressed as j-dibromo-phenoene or j-$C_6H_4Br_2$, which would associate it with the fact of its giving origin to one tribromo-phenoene only.

Mr. Groves referred to the absorption of chlorine in large quantity by chloroform and carbon tetrachloride, and thought that facts such as these ought to be taken into account. He did not think that the tendency to form symmetrical di-derivatives was so universal as suggested by the author: the formation of resorcinol from benzene-*para*disulphonic acid was a case in point.

Dr. W. H. Perkin, Jun., thought that the production from hydrazobenzene, not only of benzidine but also of an isomer, was evidence against Dr. Armstrong's view as to the manner in which para-compounds were formed.

Dr. Armstrong, replying to Professor Odling's objection that the para-derivative was the chief product, and not the ortho-, as should be the case according to his (Dr. Armstrong's) explanation of the manner in which substitution was effected, said that this was by no means always the case: in a recent investigation of the chlorotuluenes, for example, it had been shown that about twice as much ortho- as para-dichlorotuluene was formed. The proportions in which para- and ortho-derivatives were formed, appeared, however, to vary greatly, and to depend very much on the conditions obtaining at the time of change. He was of opinion that the behaviour of the paraffins afforded the strongest evidence in support of his view that addition preceded substitution: the affinity of the carbon-atoms being all but satisfied, especially in the lowest terms, substitution was effected but slowly in consequence of the small extent to which the chlorine was able to combine with the paraffin; and it was most important to observe that when chlorine had once become introduced, the introduction of other atoms could be effected more and more readily—the chlorine already introduced rendering the molecule more ready to combine with chlorine. Mr. Groves's reference to the solubility of chlorine in chloroform and carbon tetrachloride was most apposite. The behaviour of hydrazobenzene appeared to him to be perfectly in harmony with his views, the isomer formed along with benzidine being the otho-compound. Cases such as were referred to by Mr. Groves were probably not simply isomeric changes, but involved the successive occurrence of several distinct changes.

Some Derivatives of Tetramethylene. By G. H. Calman and Dr. W. H. Perkin, Jun.

Derivatives of Pentamethylene. By Dr. W. H. Perkin, Jun.

The Action of Chlorine on Methyl Thiocyanate. By Dr. J. William James, University College, Cardiff.

The Decomposition of Potassium Chlorate and Perchlorate by Heat. By Percy F. Frankland, Ph.D., B.Sc., A.R.S.M., and John Dingwall. The authors have reinvestigated the points in the decomposition of these bodies which were raised by Teed (*Proceedings*, Nos. 12 and 16, 1885-6). In the first series of experiments, potassium chlorate was partially decomposed by heating in a tube over a naked flame. The results are summarized in the following table:—

Percentage of oxygen evolved on weight of $KClO_3$ taken.	On $KClO_3$ actually decomposed.			
	Percentage of oxygen evolved.	KCl formed (p.c.).	$KClO_4$ formed (p.c.).	Proportion of oxygen evolved to 74·57 parts of KCl formed.
No. 1. 2·66	6·30	22·48	71·22	20·87
No. 2. 5·19	6·27	22·43	71·30	20·84
No. 3. 6·47	7·09	23·68	69·23	22·32
Equation— $10KClO_3 = 6KClO_4 + 4KCl + 3O_2$ requires	7·83	24·34	67·83	24·00
$8KClO_3 = 5KClO_4 + 3KCl + 2O_2$ requires	6·53	22·81	70·66	21·33
$2KClO_3 = KClO_4 + KCl + O_2$ requires	13·05	30·42	56·53	32·00

In further experiments the potassium chlorate was decomposed at a temperature below that at which potasslum perchlorate suffers change, by heating it in the vapour of boiling sulphur. It appears, therefore, that when potassium chlorate is partially decomposed by heat, the decomposition may be expressed by equations of the type $8KClO_3 = 2O_2 + 5ClO_4 + 3KCl$, and that the more complete the decomposition the more does it approximate to that indicated by the equation $2KClO_3 = KClO_4 + KCl + O_2$. The authors have fully established the formation of potassium chlorate in the first stages of the decomposition of potassium perchlorate. This reaction is of interest as forming an exception to Berthelot's law of maximum work, the well-known formation of potassium perchlorate from potassium chlorate being a reversible reaction. In a first series of experiments with perchlorate, the potassium chlorate was determined by means of the zinc-copper couple method. Finding, however, that the sample had a very slight action on perchlorates, a second series of experiments were made, in which the chlorate formed was determined by evaporation with chlorhydric acid; the results entirely substantiate those of the first series, and are as follows:—

Percentage of oxygen evolved on weight of $KClO_3$ taken.	On $KClO_3$ actually decomposed.			
	Percentage of oxygen evolved.	KCl formed (p.c.).	$KClO_4$ formed (p.c.).	Proportion of oxygen evolved to 74·57 parts of KCl formed.
No. 1. 6·89	8·14	25·44	66·42	23·88
No. 2. 6·78	8·76	26·03	65·21	25·10
No. 3. ($KClO_3$ mixed with powdered glass) 14·30	15·34	33·55	51·11	34·10

Percentage of oxygen evolved on weight of $KClO_4$ taken.	On $KClO_4$ decomposed.			
	Oxygen evolved (p.c.).	KCl formed (p.c.).	$KClO_3$ formed (p.c.).	Oxygen evolved to 74·57 parts of KCl formed.
No. 1. 6·34	36·54	38·70	24·76	70·41
No. 2. 7·80	36·63	38·79	24·58	70·42
No. 3. 24·05	43·60	49·21	7·19	66·06
The equation— $7KClO_4 = 2KClO_3 + 5KCl + 11O_2$ requires	36·29	38·44	25·27	70·40

Review.

MANUAL OF PRACTICAL PHARMACEUTICAL ASSAYING, including Details of the Simplest and Best Methods of Determining the Strength of Crude Drugs and of Galenical Preparations.* By A. B. LYONS, A.M., M.D.

Pharmacists will find this a very useful collection of the processes which give the best practical results in the assaying of the more important drugs, and which are best suited for the use of the ordinary pharmacist, being as simple as they can be made consistent with a moderate degree of accuracy, and requiring as little special apparatus as possible. Now that the assay of the strength of galenical preparations and drugs is becoming more general, a handbook of this description will be welcomed by many. The author is of opinion, and there are many who will agree with him, that the time is not far distant when physicians will insist on fixed standards of strength for the preparations of all active drugs. The last British Pharmacopœia has already made a step in this direction in the case of preparations of opium, nux vomica, and cinchona, but there are many other powerful drugs which are liable to vary in the proportion of their most active constituents, and although there is as yet no compulsory standard for them, it is obviously desirable that as much uniformity as possible in their preparations should be secured by a preliminary assay of the drug, and the use only of such as are of average strength.

The processes given have been collected from various sources, many being of comparatively recent origin, and as a rule two or three alternative methods are given for each drug. The number of drugs for which methods of assay are given is rather limited, but fairly representative, and several methods of general applicability are also described. Many of these processes have been originated or modified by the author to give results of sufficient accuracy for practical purposes with less expenditure of time and labour than would be required to obtain results of extreme accuracy, and these will often be found very useful.

The chapter on the volumetric estimation of alkaloids by Mayer's reagent deserves careful reading, and the discrepancies between the figures given by the author as the result of careful experiments, and those given by Mayer himself, or the tables quoted in Dragendorff, are very startling. In fact, having regard to the enormous differences produced by the degree of dilution of the alkaloidal solution and other circumstances, and the feeling of uncertainty left in the mind after its use, it is surprising that this method has found so much favour; we should never be inclined to use it where any reasonably good gravimetric method might be made available.

With the descriptions of these generally applicable methods is included a good scheme of proximate analysis by H. B. Parsons, which has appeared in this Journal; also an extract from Dragendorff's 'Plant Analysis' on the separation of alkaloids from each other by means of solvents. The drugs for which special modes of assay are given are aconite, belladonna and stramonium, cinchona, coca, colchicum, conium, digitalis, elaterium, gelsemium, guarana, hydrastis, hyoscyamus, ipecacuanha, nux vomica, opium, physostigma, pilocarpus, podophyllum, quebracho, rhubarb, tobacco and veratrum, and there are also directions for the estimation of alcohol, glycerine, amyl nitrite, and spirit of nitrous ether. We are rather surprised to find that the methods given for cinchona do not include the easy and rapid method which is now official in the British Pharmacopœia, and we are not inclined to put much trust in the physiological tests recommended, except for very rough purposes; more especially unreliable seems to us the proposal to estimate the proportions of strychnine and brucine in a mixture by comparing its bitterness with that of the pure alkaloids.

The assay of ipecacuanha seems to be a matter not yet satisfactorily settled. In the work before us the author states that he has seldom found this drug to contain less than two per cent. of emetine, and thinks Flückiger's results too low, either on account of his having operated on poor drugs, or from his process being untrustworthy; while on the contrary, Jones, in a paper read at the last meeting of the British Pharmaceutical Conference, maintains that Flückiger's process gives accurate results and that the drug seldom contains much more than one per cent of emetine.

The two methods given for the estimation of nicotine in tobacco are not very satisfactory, both being by distillation with alkali and titration of the distillate with standard acid; but those for coniine are better, and in regard to the latter, we agree with the author that Dragendorff's statement as to hydrochlorate of coniine being volatile at ordinary temperatures is for all practical purposes incorrect.

There are one or two verbal inaccuracies such as the substitution of "two" for "ten" (p. 48) "157° C." for "15·7° C." (p. 68) and "colchicum root," for "colchicum corm:" these, however, are very few.

The author very properly recommends the use and adaptation of the simplest apparatus wherever possible. For instance, in the estimation of spirit of nitrous ether by Allen's method, instead of having a special apparatus for the purpose, it is recommended to use an ordinary burette inverted in a vessel of salt solution, and with a small funnel attached to the point. This in our own experience for some time past has been found to be just as efficient as the instruments made expressly for the purpose. The whole work is written in a very plain, terse manner, very much resembling an ordinary laboratory note book, and concludes with tables of analysis of several typical drugs made by the author.

* Detroit: D. O. Haynes and Co. 1886.

BOOKS RECEIVED.

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION at the Thirty-Fourth Annual Meeting, Philadelphia, held at Providence, R.I., in September, 1886. From the Association.

A TEXT-BOOK OF INORGANIC CHEMISTRY. By Professor VICTOR VON RICHTER. Translated from the Fourth German Edition by EDGAR F. SMITH. London: Trübner and Co. From the Publishers.

CHEMISTRY OF THE CARBON COMPOUNDS; OR ORGANIC CHEMISTRY. By Professor VON RICHTER. Translated from the Fourth German Edition by EDGAR F. SMITH. London: Trübner and Co. From the Publishers.

PROCEEDINGS OF THE FIFTH ANNUAL MEETING OF THE MASSACHUSETTS STATE PHARMACEUTICAL ASSOCIATION. 1886. Lynn. From the Secretary.

PROCEEDINGS OF THE EIGHTH ANNUAL MEETING OF THE NEW YORK STATE PHARMACEUTICAL ASSOCIATION, held in Rochester, June, 1886. Elmira. From the Secretary.

Obituary.

Notice has been received of the death of the following:—

On the 30th of November, 1886, Mr. Edwin Baker, Chemist and Druggist, Button Road, Stratford, E. Aged 66 years.

On the 2nd of February, 1887, Mr William Charleson, Chemist and Druggist, Bedford Leigh, Lancs. Aged 55 years.

On the 3rd of February, Mr. John Eaton Dewar, Chemist and Druggist, Great James Street, Lisson Grove, N.W. Aged 70 years.

On the 3rd of February, Mr. George Kershaw, Pharmaceutical Chemist, Kentish Town Road, N.W. Aged 57 years.

On the 3rd of February, Mr. John Ashlin Thomas, Pharmaceutical Chemist, Market Place, Boston. Aged 42 years. Mr. Thomas had been a member of the Pharmaceutical Society since 1868.

On the 10th of February, Mr. Levi Stanniforth, Chemist and Druggist, Rye Bank, Sheffield. Aged 54 years.

On the 13th of February, Mr. Charles William Knowles, Chemist and Druggist, Market Place, Thorne. Aged 54 years.

On the 14th of February, Mr. Edward Beckington Smith, Chemist and Druggist, Askew Place, Gateshead. Aged 52 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Registrar's Report, and a New Scheme.

Sir,—On perusing the Registrar's Annual Report for 1886, I was struck with one or two facts contained therein. Of course it is something, as you state in last week's Journal, "that with regard to the percentage relation with the entire body of chemists, the Society has maintained its position during the past year," but I do not think there is much cause for congratulation here. I gather from the report, that of the 5675 persons who possess the Minor qualification, only 2180 of them are connected with the Society; also that the total number of pharmaceutical chemists and chemists and druggists connected with the Society only average a little more than 34 per cent. of those on the register. This is not as it should be, and some remedy ought to be devised to counteract it. The only one I can see, is to make the Society more popular with the trade generally, and endeavour to arouse some interest in those lethargic people who still remain outside.

The Society should be a powerful bond of union and the means of drawing closer together those who follow the calling of pharmacy. It will be granted there are great difficulties to confront in bringing about this end, owing to the many different phases and classes that compose the business in one way and another. For instance, the chemist in the town, who nowadays has to compete with stores, etc., wants matters looked at from his special point of view, and wishes his wrongs redressing, which the country chemist probably knows nothing about, and does not comprehend. Another matter which ought to command early consideration is that the important class of Associates in Business, who compose the bulk of the Society, should be eligible for election, and should be represented in the Council. It would infuse new blood into it, which in itself would be an advantage, besides making the Council more representative of the body generally.

The unlimited sale of poisons by unqualified persons and stores, and why the the offenders are not prosecuted, is a continual source of lament, and a frequent grievance against the Society. I should suggest that defence or vigilance committees should be formed throughout the country, each committee having its centre in one of the large towns, and having a certain district of the country to look after, which should be mapped out. These committees should be composed of a representative from each town or village in the district, with the Local Secretary of the Society as Chairman, who should meet at certain times and report any cases requiring prosecution to the Registrar, who would doubtless undertake to institute the necessary proceedings against the offenders.

Thus the Society would not only gain in popularity, but many who have kept aloof would come forward to its support. The Chemists and Druggists' Trade Association is dying a natural death, and no such organization would be needed if some scheme of this kind was carried out and properly worked.

I believe that when those who are still unconnected with the Society see that it is thus aiming in a practical manner for their benefit, and defending them from unqualified and unscrupulous traders, they will see it is to their interest to enlist under its banner. C. J. S. Thompson.

[*** Our correspondent is in error in his statement that "of the 5675 persons who possess the Minor qualification only 2180 of them are connected with the Society." The fact is, that out of the 1758 Pharmaceutical Chemist Members, 1181 possess the Minor qualification; besides which the qualification is also possessed by 21 Chemists and Druggist Members, 932 Associates in Business, and 900 Associates not in Business. The total number of persons possessing the Minor qualification who are connected with the Society is therefore 3034 instead of 2180.—Ed. Pharm. Journ.]

The Future of Pharmacy.

Sir,—I have read with attention "A Sheffield Student's" remarks upon my letter of January 29, and, whilst congratulating him upon his fluency of expression, must dissent from his arguments.

He says, "It ought to be patent to everyone who can reason from facts that no one can care for the public safety so well as the public itself." I fail, in reading his letter, to find where he gives the facts upon which he grounds that assertion. On the contrary I would point out, first, that the public elect certain persons from amongst themselves to form a Parliament to enact rules and laws for their protection and safety. Second, that the Parliament thus elected have seen fit to pass an Act in which it states "that it is expedient for the safety of the public" that the Pharmaceutical Society should possess certain powers. Evidently the representatives of the people do not think with the "Sheffield Student" that "no one can care for the public safety so well as the public themselves," and did think with myself that the Society should have for its special object "the care of the public safety," and I would ask, if he is right, where is the necessity of the Pharmaceutical Society, the education of pharmacists, or all the means taken under the Act to ensure the public safety, if, as he asserts, the public can take better care of themselves?

The whole of the criticism in the part of his letter devoted to myself is based upon the quotation already given and on this one, that "every individual pharmacist must be a law to himself," *i.e.*, do that which is right in his own eyes. If that were correct and based on facts, the "Sheffield Student" must be classed as one who would willingly abolish the Pharmacy Act, and necessarily with it the Society.

As to the statement that "the public takes good care of itself," the fact of there being preventive legislation of any kind is a denial. What is the use of the "Adulteration of Food and Drugs Act," if the public can take care of itself? Is not the Act itself an acknowledgment of the contrary? In the latter part of his letter our "Student" admits it when he says, "the poorer classes suffer most by the fraud." The poorer classes being a part and the greater part of the public, he thus admits, cannot "take good care of themselves."

I quite agree with him that "corrupt members when joined together make a perfect body," but when joined to healthy members, they only taint them, and that I take to be the object of the recent prosecution to prevent.

It would be a great step in advance if the Pharmacopœia was established as the legal standard for all preparations sold retail by chemists. Look at the question raised respecting tincture of opium. Suppose a person has been taking tincture prepared within the line drawn by our stipendiary, that is, with as little opium and as little spirit as will enable it to be sworn that there is some of both in the tincture. Then let him take an equal fluid measure of tincture prepared by a chemist who holds to his pharmacopœial standard, the person would run considerable danger of having taken his last dose, and, as we are told, the public takes "good care to look after itself," and

must, therefore, be right, the man who follows the Pharmacopœia must be in the wrong, by endangering the public's life.

I would ask our "Sheffield Student," that with those "ethical considerations" he wishes not to be ignored he would join with them an earnest desire that the law be made a terror to evildoers

4, *High Street, Sheffield.* GEORGE A. CUBLEY.

Sir,—Permit me to say I object to enter into correspondence with an individual who has not the moral courage to append his own name to the letter which appeared in last week's Journal.

Sheffield. WILLIAM WARD.

Sir,—Allow me the privilege of replying to your correspondent, who, under the *nom de plume* of "A Sheffield Student," makes what might be termed a personal attack on two gentlemen of this town.

I emphatically repudiate his authority to speak on "behalf of true students generally," and further, Mr. Cubley was quite justified in referring to the "younger members" in his letter. For at the meeting of the local Association, held a short time ago, I believe almost every one of the "younger members" voted with the majority, in favour of "trade standards being recognized for medicinal preparations."

"It ought to be patent to every one who can reason from facts" that one of the authorized functions of the Pharmaceutical Society is "the care of the public safety," that responsibility being cast upon it by Act of Parliament in the "Pharmacy Acts" and "Amendments." And what is Parliament but the crystallized opinion of the public or State? Therefore who can deny "the care of the public safety" was not entrusted to the Pharmaceutical Society, by the public and for the public?

If (as your correspondent seems to imply it ought to be) the sale of "poisons" was left to the working of "natural causes," there would soon be as many deaths from poisoning as from "natural causes."

Your correspondent evidently writes in sublime ignorance of there being such things in existence as the "Pharmacy Acts" and "Amendments." I would refer him to p. 26 of the Calendar, a careful study of a few pages from there, would give him much necessary enlightenment.

In reference to his query about the vendors of diluted tinctures, if I gather his correct meaning (which I must confess is a difficult matter in his jumbled epistle) it is this: that dishonesty is a necessary qualification to a poor pharmacist. Comment on such a monstrous assumption as this is superfluous.

What is most amazing in your correspondent's production is his vague reasoning (?) against legislation. He says:—"I feel, sir, that your standpoint is the right one, and that every individual pharmacist must be a law to himself. Until this is the rule, and everyone performs the miscellaneous details of his business in certain ways," etc., etc., and further talks about "proper tests" being applied. How are these "proper tests" and this "certain way" to become universal, unless there is some legal standard authority and some authorized body to enforce it? What so likely as the Pharmacopœia being taken as the standard and its use being enforced, or a prosecution made under the "Food and Drugs Act?"

It is most ludicrous to insinuate that Local Secretaries should be less sensitive than other members of the trade, to what is really the adulteration and false marking of dishonest men.

I understand by the term "wholesome competition" that honest, manly competition is meant; say, a customer asks for sweet nitre, the genuine article to be supplied, not equal parts of sweet nitre and water. For I fail to see, sir, how an ordinary member of the "discerning public" is to distinguish between the genuine and the diluted preparation.

As to paregoric *minus* opium, I venture to say your correspondent would have some difficulty in proving that his beloved "discerning public" really desire the opium to be *minus*. For on the authority of our worthy stipendiary paregoric is undisputably a soothing preparation. And what so likely to soothe as the opium?

Your correspondent asks the question, "Are people, visiting the establishments of qualified pharmacists, supplied with the quality demanded, etc.?" I can (as far as my limited experience goes) decidedly answer him in the affirmative. And further, that the "scientific and intelligent" members of our "profession" do not "dilute" for the sake of extra profit.

The fact is, in my opinion, it is what might be termed the uneducated members of the trade and outsiders, such as drug mart, drug store, herbal medicine depôt proprietors and "sham druggists," who dilute sweet nitre, etc.

Therefore it is manifestly unfair that the law allows these people to palm on the innocent "discerning public" their half-and-half preparations with impunity.

I am convinced, sir, that the sooner there is an alteration in the law the better it will be for the "discerning public" and the honest pharmacist.

T. LOWE HOLLELY,
Student at the Sheffield School of Pharmacy.

THE VOLATILITY OF CAFFEINE.

Sir,—I should feel indebted if you will correct the erroneous statements attributed to me in last week's issue concerning the presence of caffeine in the sublimate obtained in coffee roasting.

The statement I made was that I had never failed to detect the presence of caffeine in these sublimates, thus showing that a loss took place. This you will find is diametrically opposed to the printed matter in the Journal.

Ossory Villa, Ossory Road. WATSON WILL.

THE POISON CABINET.

Sir,—I have read report of the Evening Meeting of the Society, in the Journal of Saturday, and particularly note the remark concerning a new "poison cabinet" of American origin.

Mr. Passmore is right; beyond the application of electricity, the utility of which is doubtful, the mechanical arrangement and general idea is practically identical with that patented by my father fifteen years since. I may be pardoned for thinking that Young's poison cabinet has not yet been improved on.

Sankey Street, Warrington. J. RYMER YOUNG.

LINIMENTUM TEREBINTHINÆ.

Sir,—In view of the different results obtained by the various makers of this preparation, I beg, with your permission, to make a suggestion, which will, if acted on, produce a liniment of an elegant and uniform character, with very little expenditure of time and trouble.

My suggestion is to use rectified spirit in place of the water ordered in the British Pharmacopœia. By doing so and dissolving the soap in the spirit of wine, the camphor in the turpentine, mixing the solutions and filtering the mixture a bright and elegant liniment may be made, which would, I think, be satisfactory to all.

48, *Porchester Road. W.* W. SMITH.

Erratum.—On p. 660, col. ii., lines 8, 11 and 14, for "Shade Hill," read "Shude Hill."

Marking Inks.—Verax asks for information as to reliable forms for preparing from aniline dyes black and crimson marking inks which will not require the application of heat.

C. B. G.—A note on "Our Salad Herbs" was published in the *Pharmaceutical Journal* for August 27, 1870; but we are not acquainted with any book specially devoted to the subject.

H. S.—See articles on the estimation of tannins by Mr. H. R. Procter, in the *Pharmaceutical Journal*, [3], vii., 1020, and xvi., 843.

C. W. Bobby.—We are unable to inform you as to the address of the person mentioned.

COMMUNICATIONS, LETTERS, etc., have been received from Miss Mitten, Messrs. Haydon, Martin, Turrup, Baildon, E. O.

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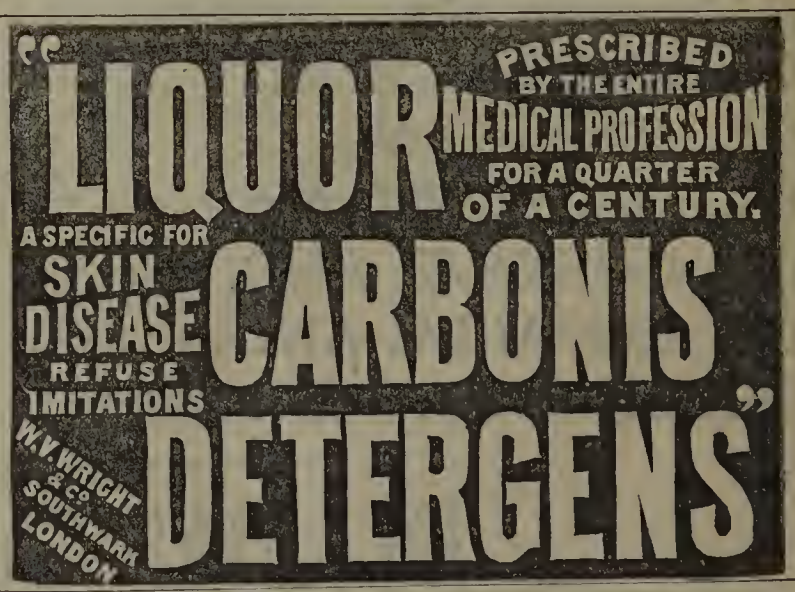

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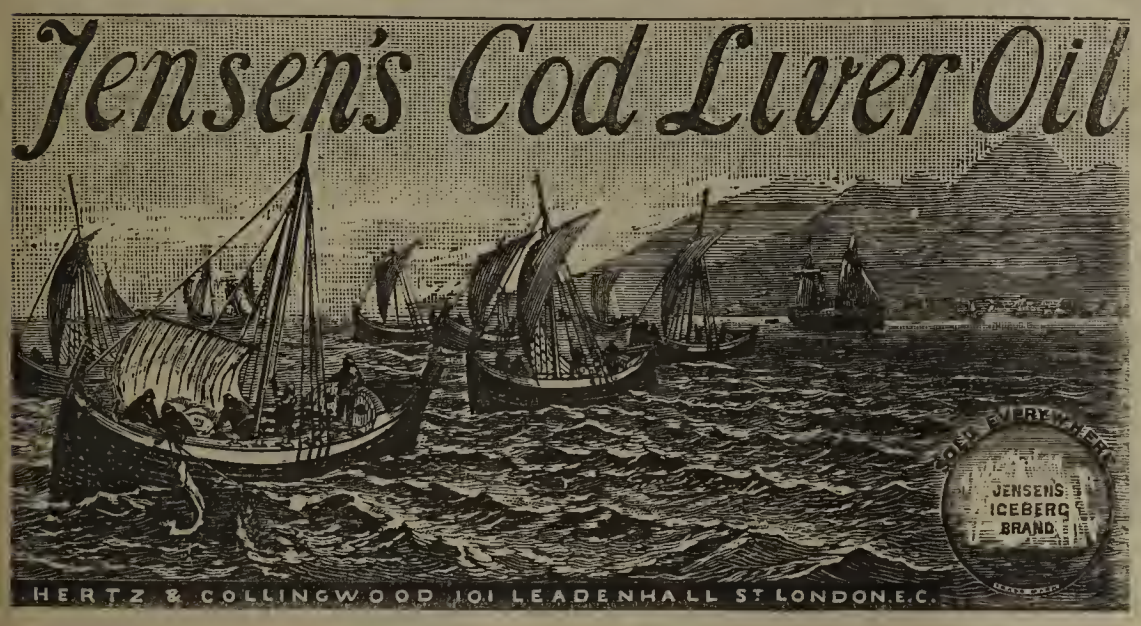

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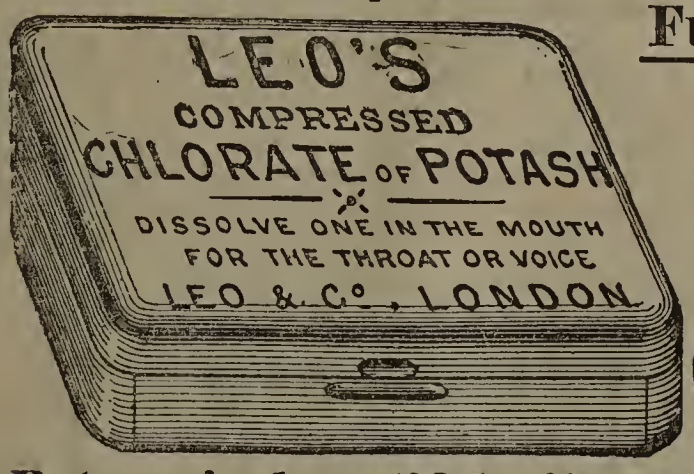

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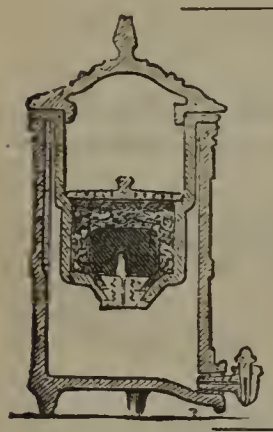

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SUPPLIED BY THE WHOLESALE DRUG TRADE GENERALLY.

	Retail at	Per Doz.
Ammon. Bromide, 5 gr. 100 in bottle	.....	..... 27/0
,, ,, 10 gr. 100 ,,	.....	..... 38/0
Ammon. Chloride, 3 gr.	..... 1/0	..... 8/0
,, ,, 3 gr.	..... 2/0	..... 15/0
,, ,, 3 gr. 100 in bottle	.....	..... 22/0
,, ,, 5 gr. 100 ,,	.....	..... 24/0
,, ,, 10 gr. 100 ,,	.....	..... 34/0
Ammon. Chlor. with Borax 100 ,,	.....	..... 30/0
Antipyrin..... 5 gr.	.....	..... 32/0
,, ... 5 gr. 100 in bottle	.....	... 100/0
Bismuth Sub-nit.... 5 gr. 100 ,,	.....	..... 38/0
,, ,, 10 gr. 100 ,,	.....	..... 47/0
Caffeine Cit..... 1 gr. 100 ,,	.....	..... 42/0
Cathartic Comp., U.S.P. 100 ,,	.....	..... 24/0
Cinchonidia Salicylate, 2 gr. 100 ,,	.....	..... 90/0
Cocaine with Potash and Borax (*see* Voice)		
Ipecac. and Opium ..... 100 in bottle	.....	..... 38/0
Ipecac. Powd..... 100 ,,	.....	..... 27/0
Iron and Quin. Cit. ..... 25 ,,	.....	..... 15/0
,, ,, ... 100 ,,	.....	..... 42/0
Laxative Vegetable ..... 100 ,,	.....	..... 24/0
Lithia Carbonate... 2 gr. 100 ,,	.....	..... 42/0
Manganese Dioxide, 2 gr.	.....	..... 12/0
,, ,, 2 gr. 100 in bottle	.....	..... 36/0
Pepsin Saccharated, 5 gr. 100 ,,	.....	..... 48/0
Peptonic	2/6	..... 20/0
,, ...	4/0	..... 36/0
,, ... 100 in bottle	7/0	..... 66/0
Potash Bicarbonate, 5 gr.	1/0	..... 8/0
,, ,, 5 gr.	2/0	..... 15/0
,, ,, 5 gr. 100 in bottle	3/0	..... 22/0
Potash Chlorate ... 5 gr.	1/0	..... 7/6
,, ,, 5 gr.	2/0	..... 14/0
Potash Chlor. ($2\frac{1}{2}$ gr.) with Borax ($2\frac{1}{2}$ gr.)...	1/0	..... 7/6
,, ,, ,, ,, ,, ,, ...	2/0	..... 14/0
Potash Nit. (*Sal. Prun.*) 5 gr. 100 in bottle	.....	..... 27/0
Ptsh. Permanganate 1 gr. 100 ,,	.....	..... 24/0
,, ,, 2 gr. 100 ,,	.....	..... 36/0
Potassium Bromide 5 gr. 100 ,,	.....	..... 27/0
,, ,, 10 gr. 100 ,,	.....	..... 38/0
Potassium Iodide... 5 gr. 100 ,,	.....	..... 42/0
*Quinine Bisulphate 1 gr. 100 ,,	.....	..... 24/0

	Retail at	Per Doz
*Quinine Bisulphate 2 gr. 100 in bottle	.....	..... 40.0
* ,, ,, 3 gr. 100 ,,	.....	..... 54/0
* ,, ,, 5 gr. 100 ,,	.....	..... 84/0
Rhubarb .....3 gr. 25 ,,	.....	..... 10/0
,, ...3 gr. 100 ,,	.....	..... 24/0
Soda Bicarbonate...5 gr.	..... 1/0	..... 8/0
,, ,, ...5 gr.	2/0	..... 15/0
,, ,, ...5 gr. 100 in bottle	3/0	..... 22/0
Soda Chlorate .....5 gr.	1/0	..... 8/6
,, ,, ...5 gr.	2/0	..... 16/6
,, ,, ...5 gr. 100 in bottle	3/0	..... 27/0
Soda Chlor. with Borax 5 gr.	1/0	..... 8/6
,, ,, ,, 5 gr	2/0	..... 16/6
,, ,, ,, 5 gr. 100 in bottle	3/0	..... 27/0
Soda-Mint (*or Neutralising Tablets*).....	1/0	..... 8/0
,, ,, ,, ...	2/0	..... 15/0
,, ,, ,, ...	3/0	... 22/0
Soda Salicylate ...3 gr. 100 in bottle	.....	..... 38/0
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,, c. Amyl..... 25 ,,	.....	..... 14/0
,, ,, ... 100 ,,	.....	..... 30/0
Urethane .....5 gr.	.....	..... 27/0
,, ...5 gr. 100 in bottle ...	.....	..... 87/0
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,, ,, ...	2/0	..... 14/0

* Subject to fluctuations of the Market.

BURROUGHS, WELLCOME & CO., Snow Hill Buildings, London, E.C.

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The Pharmaceutical Journal AND Transactions.

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Benevolent Fund

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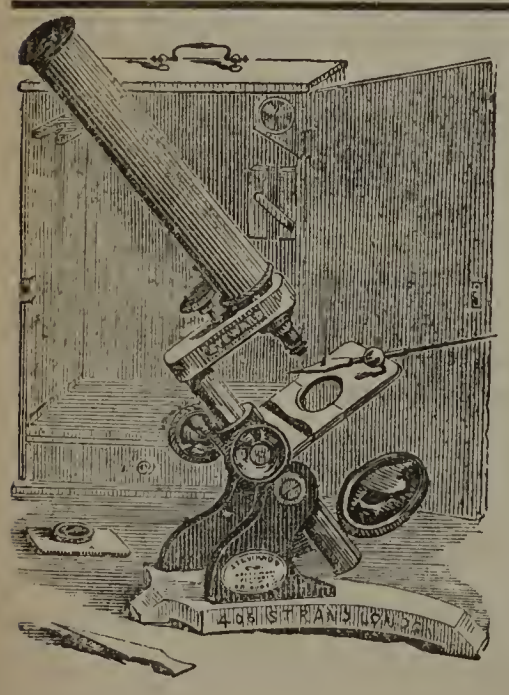

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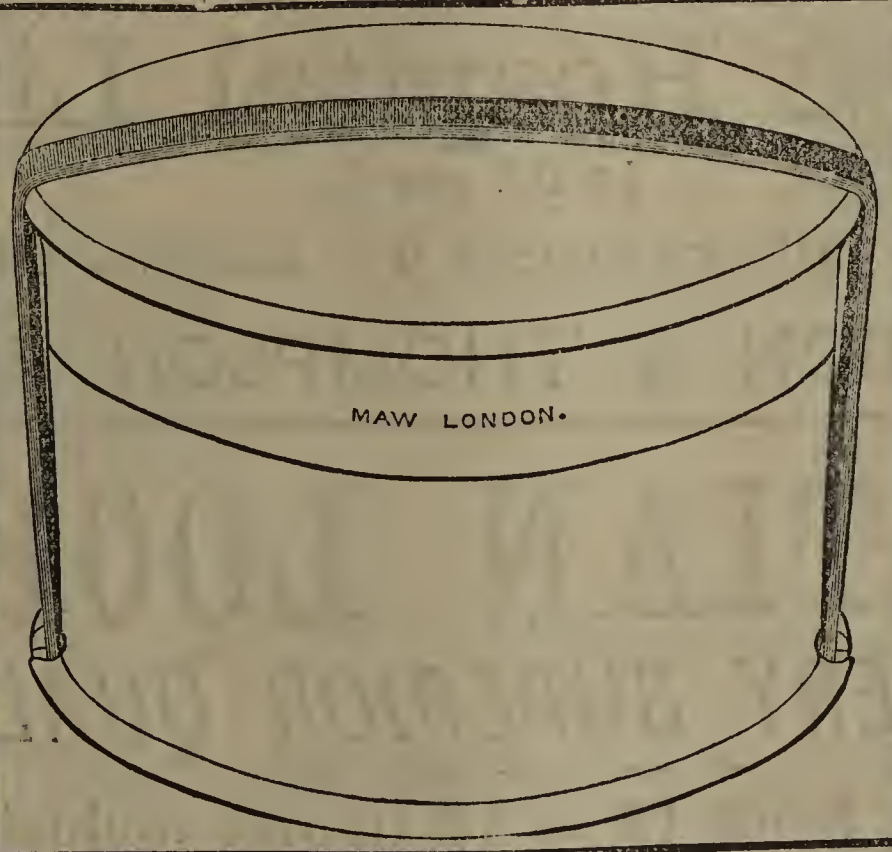

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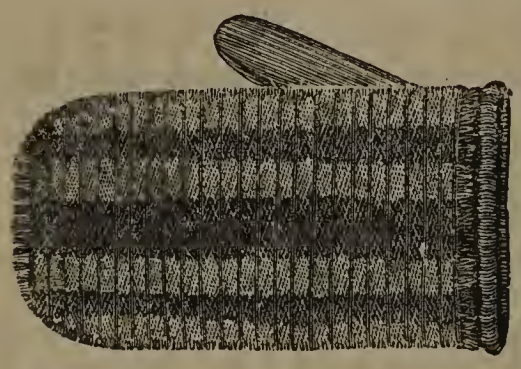
HORSE-HAIR FLESH GLOVES

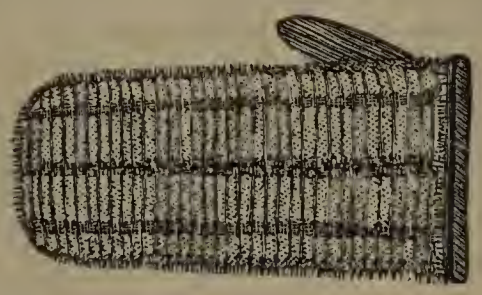
BELTS, BATH BRUSHES, &c.



GENT'S FLESH GLOVE (*In Pairs*).

For dry use only.

Best quality, in grey and black hair of various degrees of hardness. A healthy and invigorating frictor for regular daily use. A positive luxury before a shower or sponge bath. 5/ per pair, retail.



LADY'S FLESH GLOVE (*In Pairs*).

For dry use only.

In light hair; for promoting a healthy action of the Skin. Anti-rheumatic and invigorating. 5/ per pair, retail.

CLARENDON FLESH RUBBER.

For wet or dry use.

Hair on both sides. One surface is soft, the other hard; either may be used for friction. Suited to the most DELICATE skin. 3/6 each, retail.

PRINCE OF WALES BATH GLOVE.

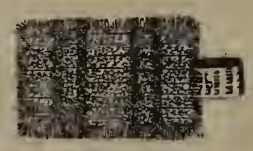
For wet or dry use. Very durable, healthful, and refreshing. A necessary addition to a Turkish or warm bath. 2/6 each, retail.

ALEXANDRA BATH BRUSH.

Hair on both sides; on a long handle. Most convenient and refreshing for the bath. 2/6 each, retail.

ARMY BATH PAD.

For wet or dry use. Hair on both sides; indispensable for the bath. Convenient and portable. 2/ each, retail.



OXFORD WASHING PAD.

For readily cleaning and softening the hands, and for the bath. 1/ each, retail.

FLESH STRAPS, OR BELTS, AND BATH STRAPS.

5/ each, retail. Hair on one side. LADIES' quality for dry use, light hair and soft pile. GENTS' quality for dry use, black or grey, and pile of various degrees of hardness. Specially useful for rubbing the back, spine, and shoulders. Bath straps are adapted for wet or dry use.

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	£	s.	d.
ABSORBENT COTTON WOOL—			
A cheap, clean, and ready mode of making all kinds of local applications, and a substitute for Sponge, 1/9 per lb.; also in boxes, per doz. 3/- and	0	6	0
ABSORBENT TISSUE—			
A layer of absorbent wool in absorbent gauze (Gamgee's Patent) ... ... per lb.	0	2	0
ABYSSINIAN SODA-WATER TAPS— The best Taps in use.			
Common quality ... ... per doz.	0	15	0
Nickel Plated ... ... „	0	18	0
ADHESIVE PLASTER— On flesh-colour fabric.			
Each in tin case. Sticks readily without being warmed. In counter cases of 1 doz. ...	0	3	6
BABY'S FRIEND—			
An ingenious contrivance for regulating the supply of food, thus preventing the over-feeding of infants ... ... per gross	0	9	0
BABY'S TOILET BOX—			
A handsome case containing comb, brush, violet powder, and nursery pins ... per doz.	0	16	0
CACHOU LOZENGES—			
Fragrant Bouquet, per lb. (in 2 lb. bottles) ...	0	1	9
Peppermints ... ... per lb.	0	1	6
Fragrant Bouquet, in boxes ... ... per doz.	0	4	0
Ditto, in boxes to sell at ... ... „	0	2	0
Ditto, ditto ... ... „	0	4	0
CAMEL HAIR PENCILS—			
1 gross assorted in a show case containing duck, goose, and extra goose ... per gross	0	4	6
Ditto, ditto, with swan pencils and sticks „	0	6	0
CEMENT— Chinese, transparent colourless liquid.			
12 sixpenny size, in glass-top box ... per doz.	0	4	0
6 one shilling size, ditto ... ... „	0	8	0
Holdfast, 12 threepenny size, on show card, per doz., 2/-; 12 sixpenny ditto per doz.	0	4	0
CORN PAINT BOTTLES—New pattern.			
Actinic green, with wood top and camel hair brush affixed, ¼ and ½ oz. ... per gross	0	18	0
Cases for ditto ... ... „	0	4	0
CORN RUBBERS—			
New "Cure for Corns," 6 on a card ... per doz.	0	2	9
Sixpenny size on bone handles, 6 or 12 on a card... ... ... per doz.	0	4	0
Shilling size (Alexander's), 6 on a card „	0	7	6
FLOATING LIGHTS (Tin)— With Reflecting Float.			
In boxes containing 60 lights... ... per doz.	0	4	0
Ditto ditto 120 ditto ... „	0	8	0
Only need an introduction to create a demand.			
INHALERS—			
The Universal Inhaler, same pattern as Dr. Taylor's (earthenware), to hold hot water, with burnt-in directions for use, with glass tubes ... ... per doz.	0	18	0
LINT—			
Hospital quality ... ... per lb.	0	1	9
Second quality, surgeon's ... ... „	0	2	0
Super surgeon's ... ... „	0	3	0
Flax ... ... „	0	3	6
In packets ... ... per gross, 7/- and	1	1	0
In boxes ... ... per doz., 3/6 and	0	7	0
Special quotations to buyers of 1 cwt.			
MEDICATED JAPANESE "CURL" PAPER—(As soft as silk.)			
500 sheets in a packet... ... ... per doz.	0	4	0
Stray Leaves from Japanese Papers, very saleable ... ... per doz.	0	8	0
MEDICATED SANITARY PAPER—			
In Suspender case, for the toilet or nursery, very saleable ... ... per doz.	0	8	0
Cases containing 50 packets	1	12	0
MEDICINE CASE—			
Graduated tumbler, in leather case ... per doz. (The cheapest article in the trade.)	0	8	6
Ditto, with minim measure ... per doz.	0	16	6
With nursery tumbler, in leather case „	0	8	0
Ditto, ditto, in boxwood ... ... „	0	9	0
MENTHOL—			
A remedy for neuralgic pains. Not liable for stamp duty, being a pure drug.			
In paper cases ... ... per doz.	0	4	0
In nickel plated jars ... ... „	0	8	0
One dozen in a counter box.			
MUSTARD LEAVES—			
Penny size ... ... per gross	0	9	0
Sixpenny size ... ... per doz.	0	4	0
1 dozen mounted on an attractive show card. (4 leaves in a packet.)			
NURSERY APRONS (Full size)—			
Black Alpaca ... ... per doz.	0	18	0
Check ... ... „	1	4	0
Super quality ... ... „	1	10	0
NURSERY LAMPS—			
The "A.B.C." The cheapest article ever introduced. Burns kerosene oil ... per doz.	1	2	0
Also the "Eclipse" Lamp for burning colza oil, with wicks and float complete, per doz.	1	4	0
SANITARY PADS OR TOWELS—			
For Ladies' Use. The cheapest and best article ever introduced for the comfort of ladies, especially while travelling. They are made of absorbent cotton wool ... per doz.	0	1	0
SEAT CUSHIONS (Waterproof)			
A *sine qua non* for travellers. Folds up in a small compass for the pocket, per doz. 13/- and	1	1	0
SOAP—			
Transparent, in ½-lb. and 1-lb. bars ... per cwt.	2	16	0
Ditto, in tablets, 2, 3, 4, 6 to the lb., „	2	18	0
Toilet, in ½-lb. and 1-lb. bars ... „	2	16	0
Ditto, in tablets, 2, 3, 4, 6 to the lb., „	2	18	0
Oval Transparent tablet (wrapped) ...per gross	1	4	0

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30 VARIETIES AT FROM 2/- PER DOZ. PAIRS.

Lists on application.

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		DOZ. BOTTLES conting. 25 PILLS	DOZ. BOTTLES conting. 100 PLS.
Aconitine Crystals (Duquesnel's)	1-500 gr	7s. 0d.	24s. 0d.
,, ,, ,,	1-200 gr	7 0	24 0
Aloes Barb. B.P.	5 gr.	5 0	16 0
,, Dilute (Hall's Dinner)		5 0	16 0
,, Socotrine, B.P.	5 gr.	5 0	16 0
,, and Asafœtida, B.P.	5 gr.	5 0	16 0
,, and Iron, B.P.	5 gr.	5 0	16 0
,, and Myrrh, B.P.	3 gr.	5 6	18 0
,, ,, ,,	5 gr.	6 0	20 0
,, Nux Vomica		6 0	20 0
Aloin	1-10 gr.	5 0	16 0
,,	1-4 gr.	6 0	20 0
,,	1-2 gr.	7 0	24 0
,,	1 gr.	11 0	39 6
,, Compound		7 0	24 0
,, and Strychnine		7 0	24 0
,, Strychnine and Belladonna		7 0	24 0
Anti-Cholera	2 gr.	7 0	24 0
Anti-Dyspepsia (Fothergill s		7 0	24 0
Aphrodisiac		16 0	59 6
Arsenious Acid	1-50 gr.	5 0	16 0
,, ,,	1-20 gr.	5 0	16 0
Asafœtida, U.S.		5 0	16 0
,, Compound, B.P.	5 gr.	5 0	16 0
Atropine	1-300 gr.	7 0	24 0
,,	1-100 gr.	7 0	24 0
Blue Mass, B.P.	1 gr.	5 0	16 0
,, ,,	2 gr.	5 0	16 0
,, ,,	3 gr.	5 0	16 0
,, ,,	5 gr.	5 6	18 0
,, ,, Colocynth and Hyoscy		9 0	32 0
Calcium Sulphide	1-10 gr.	6 0	20 0
,, ,,	1-4 gr.	6 0	20 0
,, ,,	1-2 gr.	6 0	20 0
,, ,,	1 gr.	6 0	20 0
Calomel, Colocynth, and Hyoscyamus		9 0	32 0
,, Comp. B.P.	5 gr.	5 6	18 0
,, and Opium		7 6	26 0
Camphor and Hyoscyamus		5 6	18 0
,, Mono-Bromated	2 gr.	11 0	39 6
Cannabis Indica Extract	1-4 gr.	7 0	24 0
,, ,, ,,	1-2 gr.	9 0	32 0
Cascara Sagrada Extract	3 gr.	7 0	24 0
Cathartic Compound U.S.P.		5 6	18 0
Codeine	1-2 gr.	20 6	79 0
Colocynth Comp. B.P.	4 gr.	8 0	28 0
,, ,, ,,	5 gr	9 0	32 0
,, ,, and Blue Mass	5 gr.	9 0	32 0
,, ,, and Calomel	5 gr.	9 0	32 0
,, ,, and Hyoscy, B.P.	5 gr.	9 0	32 0
,, ,, Extract, B.P.	5 gr.	9 0	32 0
Conium Compound, B.P.	5 gr.	5 0	16 0
Copaiba Compound		5 6	18 0
,, and Oloe-Resin Cubeb	5 gr.	11 0	39 6
Corrosive Sublimate	1-30 gr.	5 0	16 0
,, ,,	1-20 gr.	5 0	16 0
,, ,,	1-10 gr.	5 0	16 0
Croton Chloral	1 gr.	10 0	36 0
,, ,,	2 gr.	17 0	63 6
Cubeb, Oleo Resin, with Soda		7 0	24 0
Digitalin	1-60 gr.	7 0	24 0
Elaterine	1-20 gr.	13 0	47 6
Emmenagogue (Mutter's)		5 6	18 0
Ergotin	3 gr.	16 6	63 0
Euonymin	2 gr.	16 0	59 0
,,	3 gr.	20 6	79 0
,, Compound		16 0	59 0
Ferruginous (Blaud's)	3 gr.	6 0	20 0
,, ,,	5 gr.	7 0	24 0

PILLS.

		DOZ. BOTTLES conting 25 PILLS	DOZ. BOTTLES conting 100 PLS.
Hydrastine (White Alkaloid)	1-2 gr.	20 6	79s. 0d.
Iodoform	1 gr	9 0	32 0
,, and Iron		11 0	39 6
Ipecac. Powdered	1-4 gr.	5 0	16 6
,, ,,	5 gr.	5 0	16 0
,, Comp. (Ipecac. and Opium)	5 gr.	9 0	32 0
,, and Squill, B.P.	5 gr.	5 0	16 0
Iron Arseniate	1-8 gr.	5 6	18 0
,, Carbonate, B.P.	5 gr.	5 6	18 0
,, by Hydrogen (Quevenne's)	1 gr.	5 0	16 0
,, Iodide (Blancard's Formula)	1 gr.	7 0	24 0
,, and Quinine Citrate	2 gr.	10 0	35 6
,, Quinine, and Strychnine		13 6	49 6
Laxative Vegetable (Improved Cath.)		5 6	18 0
Manganese, Bin-oxide	2-gr.	9 0	32 0
Mercury, Bin-Iodide	1-16 gr.	5 0	16 0
,, Proto-Iodide	1-8 gr.	5 0	16 0
,, ,,	1-4 gr.	5 0	16 0
Morphine, Muriate	1-8 gr.	7 0	24 0
,, ,,	1-4 gr.	9 0	32 0
Narcotic Extracts (Brown-Sequard)		15 0	55 6
Nitro-Glycerin	1-100 gr.	7 0	24 0
,,	1-50 gr.	7 0	24 0
Opium, Powdered	1 gr.	7 0	24 0
,, and Acetate of Lead, B.P.	5 gr.	7 0	24 0
,, and Camphor		7 0	24 0
Pepsin, Pure Concentrated	1 gr.	9 0	32 0
Phosphorus	1-000 gr.	6 0	20 0
,,	1-50 gr.	6 0	20 0
,,	1-30 gr.	6 0	20 0
,, and Iron		8 0	28 0
,, Iron and Quinine		17 0	63 6
,, and Nux Vomica		7 0	24 0
,, Nux Vomica and Iron		8 0	28 0
,, and Quinine		17 0	63 6
,, Quinine, Iron, & Strychnine		17 0	63 6
,, and Valer. Zinc		11 0	39 6
Picrotoxin	1-80 gr.	7 0	24 0
Podophyllin	1-8 gr.	5 0	16 0
,,	1-4 gr.	5 0	16 0
,,	1-2 gr.	5 6	18 0
,, Comp.		8 0	28 0
Quinine, Bi-Sulphate	1-4 gr.	5 0	16 0
,, ,,	1-2 gr.	5 0	16 0
,, ,,	1 gr.	5 0	16 0
,, ,,	2 gr.	7 6	26 0
,, ,,	3 gr.	10 6	38 6
,, ,,	4 gr.	13 0	48 0
,, ,,	5 gr.	16 0	60 0
,, Sulphate	1-4 gr.	5 0	16 0
,, ,,	1-2 gr.	5 0	16 0
,, ,,	1 gr.	5 6	18 0
,, ,,	2 gr.	8 0	28 0
,, ,,	3 gr.	11 0	40 0
,, ,,	4 gr.	14 0	52 0
,, ,,	5 gr.	17 0	64 0
,, Comp. (Anti-malarial)		15 0	55 6
Rhubarb Comp., B.P.	5 gr.	7 0	24 0
,, ,, and Blue Mass	5 gr.	7 0	24 0
Rhubarb, Ipecac. and Soda		7 0	24 0
Salicylic Acid	2 gr.	7 0	24 0
,, ,,	5 gr.	11 0	39 6
,, Comp.		16 6	63 0
Soap Comp., B.P.	5 gr.	8 0	29 0
Squill Comp., B.P.	5 gr.	5 6	18 0
Strychnine	1-50 gr.	5 0	16 0
Zinc. Phosphide	1-4 gr	7 0	24 0
,, ,,	1-2 gr.	9 0	32 0
,, Valerianate	1 gr.	8 6	30 0

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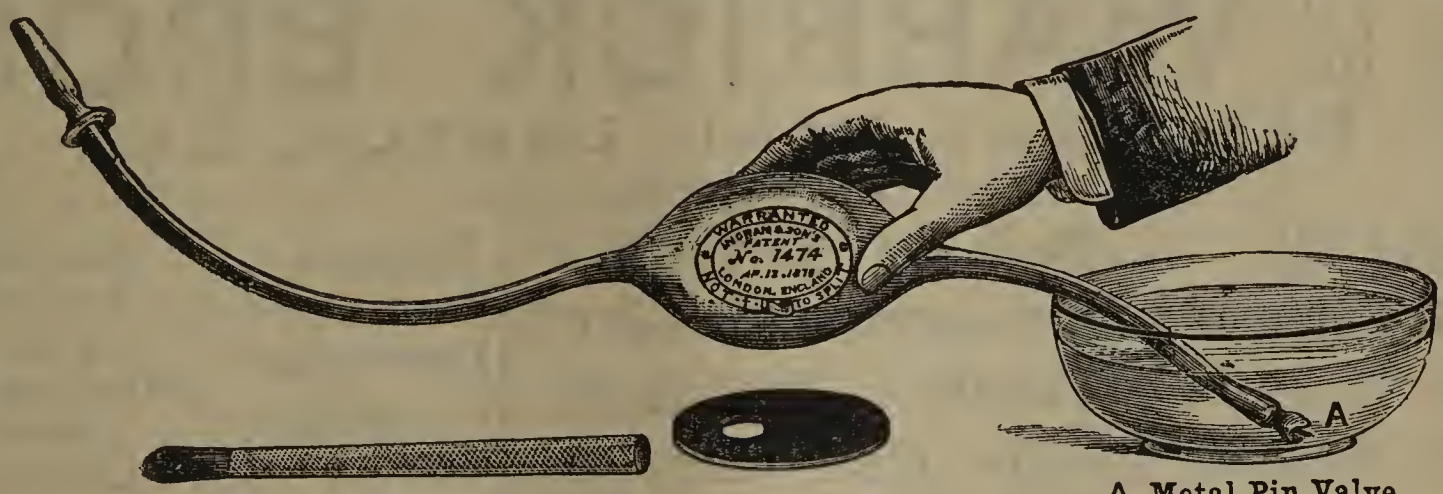
Made without Seams or Ribs by our Patent Process of Dipping in a Solution of India Rubber, thus adding great Strength and Durability.

NONE GENUINE UNLESS STAMPED WITH NUMBER OF PATENT, 1474.

CAUTION.
The only Enema made without Ribs.



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All Imitations [may] be detected by the Ribs on the surface, and are always liable to split.

WARRANTED NOT TO SPLIT.

INGRAM'S IMPROVED PATENT SEAMLESS ENEMA is perfectly smooth on the surface, will not become hard or sticky, will not leak, and will not admit air while injecting or refilling. Specially prepared to resist the heat of tropical countries.

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CAUTION.

IMITATIONS OF INGRAM'S IMPROVED PATENT SEAMLESS ENEMA are made of several pieces of Sheet India Rubber, which are cemented together and shaped in a mould, THUS PRODUCING RIBS ON THE SURFACE, and ENEMAS SO MANUFACTURED ARE ALWAYS LIABLE TO SPLIT AND LEAK AT THE SEAMS, AND THUS TO BECOME QUITE USELESS.

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Favourably noticed in *British Medical Journal*, 13th December, 1879, and in *Lancet*, 3rd January 1880, and in *British Medical Journal*, September 30th, 1882.

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Cocaine Lozenges, $\frac{1}{10}$ gr. in each.

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Essences, Flavouring, Fruit. Soluble, &c.

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Paraffinum Molle P.B. Syn. "Sanoline.'

Pepsin pur P.B., and 15 times stronger than P.B.

Pepsin Lactinated.

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„ Liquor, 3j = 3j Pepsina Porci P.B.

Perfumes, French, No. 24 in original 5, 10 and 20 oz. Bottles.

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Pills, Pearl, Sugar and Gelatine Coated.

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Syrups, Chemical, *all sorts,* superior in therapeutic value.

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Price Lists on application

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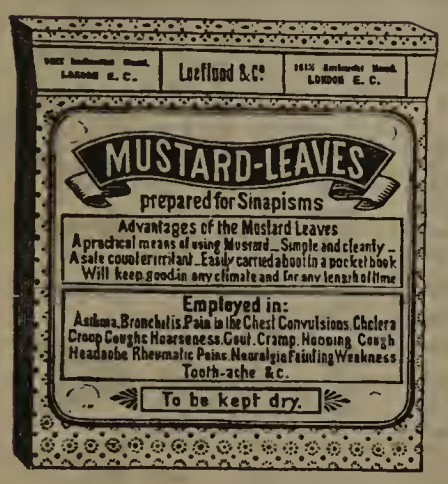

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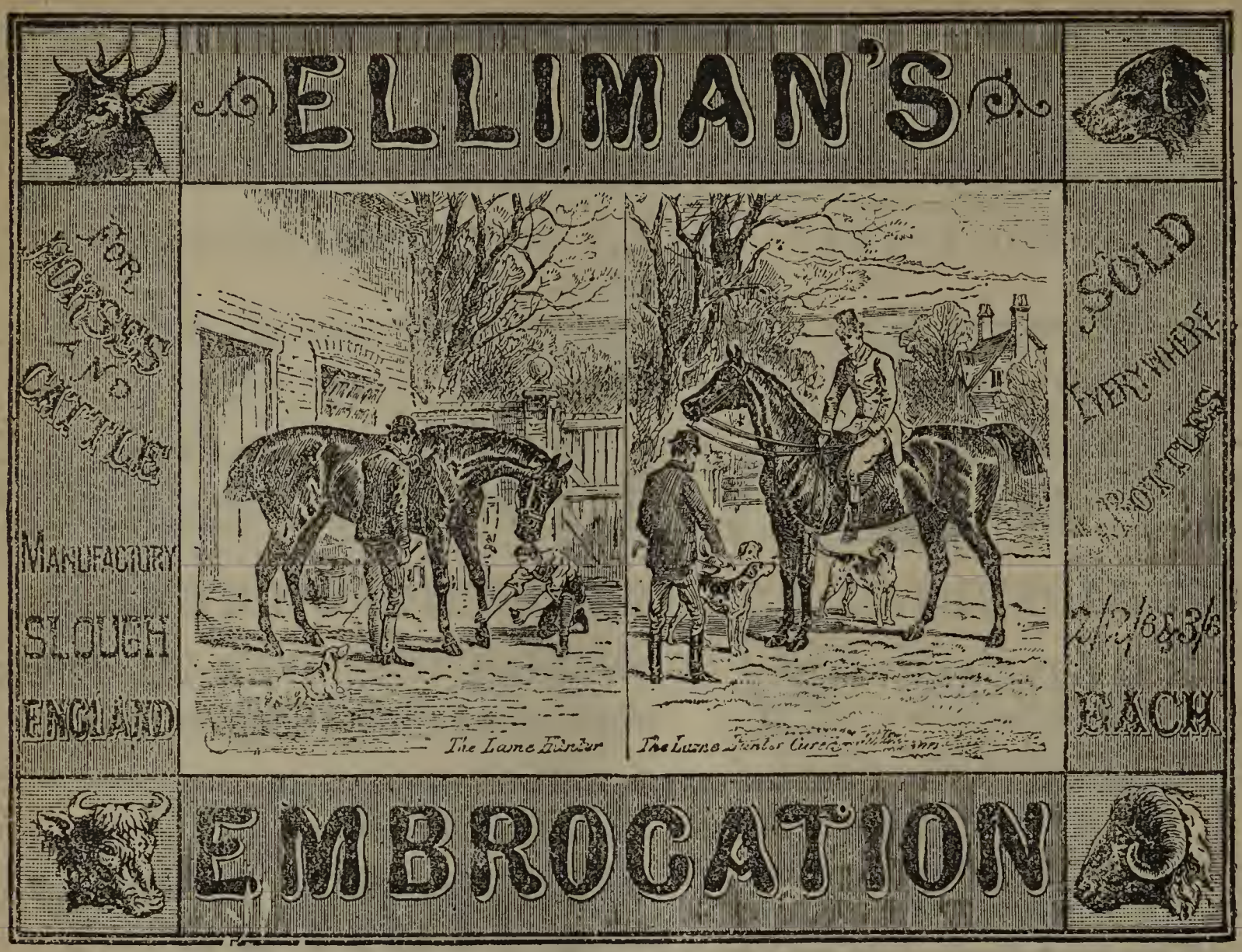

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"THE MONTH."

Antifebrin.

In a paper upon antifebrin, or acetanilid, a compound which appears to have now taken a place among the antipyretics (*Journ. Pharm.*, Jan., p. 22), M. Yvon states that in examining samples from different sources he has met with some that were unsatisfactory. He points out that it is essential to be assured of the purity of this compound, since acetanilid imperfectly purified may retain traces of aniline that would impart to it a toxic action. A delicate test for this contamination is to triturate an excess of acetanilid in water and add a little solution of sodium hypobromite. If the compound has been well purified the mixture will remain limpid and yellow; but if it contain only traces of aniline a plentiful orange-red precipitate will be produced, the liquid taking the same colour. For medical use M. Yvon recommends the rejection of any antifebrin that is not free from odour, white or scarcely rose-tinted, converted into a colourless liquid when heated on platinum foil, completely volatilizable and capable of standing the above test with sodium hypobromite. Heated in a capsule with mercurous nitrate acetanilid assumes an intense green colour; the green substance is soluble in alcohol and this reaction may be used for recognizing the presence of acetanilid in urine. The urine should be shaken with chloroform, and after the evaporation of the solvent the residue, upon being heated with mercurous nitrate, will give the green coloration if the urine contained traces of the compound.

Phenol Mercury.

Another mercurial compound has been introduced into medicine under the name of "phenol mercury" (*Zeit. österr. Apot.-Ver.*, Feb. 1, p. 53). It is described as having the composition represented by the formula $C_6H_5.OHg.OH$, and as being prepared by mixing an aqueous solution of 132 parts of "phenol potassium" with one of 271 parts of mercuric chloride, and washing the resulting reddish-orange-coloured precipitate upon a filter until the filtrate no longer shows a reddish colour upon the addition of a little potassium iodide. The precipitate is somewhat lighter in colour after drying, and has only a faint odour of phenol. The "phenol potassium" is prepared by mixing alcoholic solutions of 94 parts of crystalline carbolic acid with 56 parts of caustic potash and evaporating to dryness. This compound is, however, very hygroscopic and difficult to keep long. The phenol mercury is administered in pills containing 0·02 gram, of which the dose is at first two, increasing to six daily. Stomatitis is said to be only exceptionally produced by it.

Chromic Acid.

Notwithstanding statements that have been made from time to time that chromic acid when free from sulphuric acid is non-deliquescent under ordinary conditions (see *Pharm. Journ.*, [3], xiv., 24), the acid is rarely met with in this condition, and the article recently made officinal in the B.P., as well as those of other pharmacopœias, is described as being "very deliquescent." The presence of sulphuric acid in chromic acid is no doubt due to the method of preparation, which generally consists in decomposing potassium bichromate with strong sulphuric acid in excess, the sulphuric acid remaining adherent with great persistence, possibly in combination, as the two acids are known to form several crystalline compounds. It is stated that the article usually supplied for pharmaceutical purposes contains 7 per cent. of sulphuric acid. An "acidum chromicum cryst. puriss.," alleged to be "absolutely free from sulphuric acid," is referred to in the new descriptive list of Merck of Darmstadt, where it is stated to form "small red dry crystals which are readily soluble in water and in alcohol, and are only very slowly deliquescent in dry air." It is claimed that the acid free from sulphuric acid does not, when used as a caustic, spread over the surrounding tissue, and that therefore it is better suited for application to parts that cannot readily be protected.

Iodoform.

After being used for a time with a freedom that might almost be called indiscriminate, iodoform appears to be just now the subject of somewhat adverse criticism; the imputation that it in some cases produces toxic effects when used as a dressing for wounds having been followed by a denial that it possesses antiseptic properties. Messrs. Heyn and Rovsing, of Copenhagen, report (*Lancet*, Feb. 12, p. 328) that in order to test its germicidal reputation they prepared solutions of iodoform in olive oil and serum, and having sterilized them, studied the effects of the solutions and of iodoform powder upon cultures of various bacterial organisms; they also experimented on rabbits by mixing inoculation fluids with iodoform. Their experience was that in no case did the presence of the iodoform interfere with the development of micro-organisms, so that they conclude that as an antiseptic its employment in surgery is useless. Further, they point out that if this conclusion be correct, iodoform might itself act as a carrier of pathogenic germs, and its unguarded use might lead to mischief. They therefore recommend that before using iodoform, which is valuable as a dressing on other grounds than as an antiseptic, it should be disinfected in sublimate solution.

Haschisch.

Among the preparations of *Cannabis indica* that have been introduced is one that passes under the name "haschisch purum." It is said (*Pharm. Rundsch*, Feb., p. 42) to be prepared by treating alcoholic extract of Indian hemp with caustic alkali, which combines with all the ingredients of acid character, and brings them into solution. The residue is the "pure haschisch," and consists essentially of a mixture of the soft resin cannabinon and the alkaloid tetanine. It forms a brown soft resinoid substance, insoluble in water, but forming golden-yellow solutions in alcohol, ether and chloroform. A small dose, one-third of a grain, of "haschisch purum" is said to act as a stimulant, and a larger dose to produce the hemp effects completely, with subsequent sleep; but in determining the dose the characteristics of the patient should be borne in mind. The full effect is only produced when the drug is in a fine state of division. It is, therefore, recommended to be administered in the pastille form, with powdered cacao or powdered roasted coffee as a vehicle.

Cannabinon.

If from the foregoing preparation the poisonous tetanine be removed by means of tannic acid, the remaining cannabinon has no stimulant action, but only the narcotic property. It forms a soft brown resin, with physical properties resembling those of "haschisch," and for greater convenience in dispensing it is usually supplied as a ten per cent. trituration with milk sugar. Made up in the pastille form with cocoa or coffee, it is administered in doses of from one-half to one and a half grains as a hypnotic, especially for hy-

terical or insane patients, but it is contra-indicated where heart disease exists.

Lobelia inflata.

In a paper on *Lobelia inflata* (*Pharm. Rundsch.*, Feb., p. 32), Messrs. J. W. and C. G. Lloyd confirm the statement of Herr v. Rosen as to the presence of two alkaloids in lobelia seed (*Pharm. Journ.*, [3], xvi., 858), but they describe them somewhat differently. One of these alkaloids, for which they appropriate the name "lobeline," was obtained as a colourless and odourless amorphous substance, non-hygroscopic and apparently not affected by air, slightly soluble in water, and readily soluble in alcohol, chloroform, ether, benzol and carbon bisulphide. Lobeline salts, which, like the base, have hitherto resisted crystallization, are readily soluble in water, alcohol and ether. They are described as being most powerful emetics, one drop of a tolerably strong solution being sufficient to produce immediate emesis without disagreeable after-symptoms. Upon trituration, the dust is powerfully irritant to the nose and air-passages, more so probably than veratrine. The other alkaloid, which the authors name "inflatine," has been obtained in large colourless, odourless, and tasteless crystals, insoluble in water or glycerine, but soluble in carbon bisulphide, benzol, chloroform, ether and alcohol. Therapeutically inflatine has no apparent importance. In spite of the statements of previous workers, no volatile or liquid base was met with by Messrs. Lloyd in lobelia seeds, and it would seem probable that the supposed liquid alkaloid previously observed was a mixture of lobeline, inflatine and oil. All parts of the fresh plant contain an essential oil having a strong smell and little taste, and the seeds contain nearly 30 per cent. of their weight of a fat oil.

Purity of Quinine Sulphate.

A long paper on the testing of commercial quinine sulphate has been published by Drs. Kerner and Weller in the *Archiv der Pharmacie*, in which they insist upon the necessity of regulating the definition of the term purity as applied to that salt by common-sense considerations and not merely from the strictly chemical point of view. Naturally the ammonia test is considered by the authors as being best adapted in this sense for the purposes of pharmacy and medicine. The main defect of this test, to which reference was recently made in this Journal (see *ante*, p. 646), is now admitted by Dr. Kerner, as well as the accuracy of Hesse's observation that the presence of lævorotatory alkaloids may be overlooked when the ammonia test is applied in the way originally directed by Dr. Kerner, and thus a satisfactory justification of the step lately taken by the Paris Pharmaceutical Society has been furnished. As regards the use of the polariscope, however, the authors express most distinctly their opinion that from every point of view it is to be regarded as altogether unsuited for the purpose of testing commercial quinine sulphate, and that the results obtained by the application of this method of testing as recommended by Drs. de Vrij and Koppeschaar must necessarily be quite illusory. Practical consideration of the facts of the case, therefore, leads Drs. Kerner and Weller to the conclusion that Dr. de Vrij's statements as to the amount of cinchonidine in commercial quinine sulphate cannot have any claim to accuracy.

Test for Cocaine.

Objection has been raised against the test for cocaine suggested by Dr. Giesel,—which depends upon the formation of a violet-red precipitate on the addition of solution of potassium permanganate, without any reduction of the permanganate,—that it is too delicate, since the presence of even a minute quantity of amorphous alkaloid brings about a reduction. Mr. H. Maclagan recommends as a practically satisfactory test (*Amer. Drug.*, Feb., p. 22) to dissolve one grain of cocaine hydrochlorate in about two fluid ounces of water and add two drops of solution of ammonia. He states that, if the salt be pure, upon rubbing the sides or bottom of the containing vessels with a glass rod well-marked striæ will appear where the rod has touched, followed by the formation of a flocculent precipitate, leaving the liquid clear and bright; but that if amorphous alkaloid be present, even in moderately small proportion, no striæ or precipitate will form, the liquid remaining milky for a long time and presenting an oily appearance on the surface. Mr. Maclagan adds that the amorphous alkaloid may be partially separated from a contaminated sample of cocaine hydrochlorate by dissolving it in water and adding ammonia solution drop by drop until a flocculent precipitate begins to appear, when it will be found deposited in sticky masses on the glass and rod. This amorphous alkaloid, freed from colouring matter, is a clear yellowish transparent substance, resembling Canada balsam, but of firmer consistence, and its hydrochlorate forms a varnish-like mass that cannot be reduced to powder.

Cali Nuts.

Under the name of "cali nuts," seeds have been recently met with in commerce which according to Mr. Merck present a great similarity to the calabar bean. The external appearance and the anatomical structure leave no doubt that they are derived from a Papilionaceous plant belonging to the tribe Phaseoleæ, but nothing more definite is known as to their origin, except that like calabar beans they come from the West African coast. The only superficial distinction between the cali nut and the calabar bean is said to be that whilst the length of the latter is always greater than the breadth, the former is rounder. It has been ascertained that the cali nut contains an alkaloid which chemically and physiologically behaves like physostigmine and corresponds with it in composition.

Irisin.

From the rhizome of *Iris Pseud-acorus* Herr Wallach has separated a carbohydrate which he has been unable to identify with any hitherto known and has therefore named "irisin." It is obtained by macerating with water for two or three days the rhizomes chopped small, treating the liquid from the pressed residue with basic lead acetate, filtering and decomposing the precipitate, again filtering and treating the filtrate with alcohol which throws down the irisin (*Deut.-Am. Apot.-Zeit.*, Feb., p. 683). The pure air-dried carbohydrate is described as forming white friable pieces which superficially are scarcely distinguishable from starch. Analysis showed the composition to correspond with the formula $C_6H_{10}O_5 + H_2O$. With cold water irisin forms a paste, but when slightly warmed it forms a perfectly clear solution, which is strongly lævogyre. It does not reduce Fehling's solution when boiled, but reduction takes place immediately if the carbohydrate has been gently warmed with dilute sulphuric acid. Irisin is indeed readily converted by dilute acids into sugar, principally lævulose. The yield of irisin from the rhizome is considerable.

In a communication upon the diagnosis and therapeutics of disorders of the stomach, Dr. Riegel states (*Munich. med. Wochensch.*, Feb. 8, p. 111) that in his hands no agent has proved a better stomachic than condurango bark, which can be administered most suitably in the form of condurango wine. The "cortex condurango" of the Pharmacopœa Germanica is the bark of *Gonolobus Condurango*, which acquired a temporary notoriety some years since through being recommended as a specific against cancer.

Condurango.

As the result of some experiments as to the solvent best suited for making a solution of menthol for outward application, Professor Remington gives the preference to oleic acid (*Therap. Gaz.*, Jan., p. 36). The method of preparation recommended is to heat two hundred grains of menthol with half a fluid ounce of oleic acid in a test tube; but he says there is no difficulty in obtaining a 70 per cent. solution.

Mentholeate.

Dr. B. W. Richardson speaks very highly of peroxide of hydrogen as a remedy in hooping cough (*Asclepiad*, Feb., p. 53). In his opinion it acts in a manner very similar to dilute nitric acid, but with more effect, subduing the spasmodic paroxysm, checking the secretion in the throat, and shortening the duration of the malady. His formula for prescribing it is:—Hydrogen peroxide (10 vols.), ℥vj.; glycerine, ℥iv.; water to ℥iij. Dose, half a fluid ounce in a wine-glassful of water five or six times a day.

Hydrogen Peroxide in Hooping Cough.

M. Schmidt, in *Répertoire de Pharmacie*, continues his description of the root barks of Euphorbiaceous plants, and in the February number (p. 73) describes the microscopic structure of those of *Euphorbia corollata* and *E. Ipecacuanha*. He remarks, concerning the species indigenous to France, that the dose of the root bark of *E. Lathyris* as a purge is 1½ gram; that *E. Esula* is a hydragogue cathartic and *E. Cyparissias* acts as an emeto-cathartic in doses of 0·60 to 1 gram.

Root Bark of Euphorbiaceæ.

The root of the melon is said by Dr. Heberger to possess emetic and purgative properties, and Dr. Torosicviez has obtained from the roots a crude emetic principle by treating the aqueous extract with alcohol. It has a slightly acrid and bitter taste and is precipitated by acetate of lead and infusion of nut galls. It is easily soluble in caustic potash and is precipitated again by acids as a greyish-brown precipitate difficultly soluble in water. From experiments made with this substance in the military hospital of Lemberg (*Répertoire*, Feb., p. 76) it would seem that a solution of 9 centigrams of it is sufficient to cause vomiting. The powdered root of the wild plant acts, according to Dr. Langewicz, as an emetic in doses of 50 to 75 centigrams.

Melon Root.

The true action of colchicine has been examined by Messrs. Mairet and Combemale (*Comptes Rendus*, civ., p. 439), who find that it acts as an irritant poison, affecting more especially the digestive canal and the kidneys, though capable of irritating any of the organs. The toxic dose of colchicine in the dog and in the cat varies according to the mode of introduction into the system. The fatal hypodermic dose is ·000571 gram, and taken internally ·00125 gram per kilogram of the weight of the animal. The poisonous action is produced most rapidly when administered hypodermically.

Colchicine.

Mr. R. van Romund's report on the Dutch official cinchona cultivation (*Indische Mercuur*, Feb. 12, p. 88) affords some valuable details. The young plants derived from Schuhkraft's seed, which was sown in 1880, have now flowered and show considerable variation, some approaching the shrubby type of *C. Josephiana*, while others are nearer to *C. Ledgeriana*. Those cultivated under the name of the fine and finest calisaya of Mapivi also show many forms, the best of which might be classified as belonging to *C. Ledgeriana*, vars. *chinidinifera* and *cinchonidinifera*. The plants grown from seed obtained through the Colonial Office under the name of *C. verde* (*C. Calisaya*, var. *oblongifolia*) show a much nearer approach to the Ledgeriana type. The plantations of *C. Triana* (*C. Pitayensis*), made at an elevation of 4000 to 6000 feet, continue to flourish, and the plants have already begun to show flower-buds. The analysis of the hybrids obtained from the seed of Ledger plants hybridized with *C. succirubra* have afforded interesting results, inasmuch as the hybrids, agreeing in habit, form of leaf and flower with the *C. Ledgeriana*, show a very high average percentage of the characteristic alkaloids. In some of the hybrids, not only was as large a percentage of quinine found as in the typical Ledgeriana, but also an amount of cinchonidine exceeding that found in *C. succirubra*.

Java Cinchonas.

M. P. Guyot (*Rép. de Pharm.*, Feb., p. 87) gives the following tests for oil of peach kernels:—With caustic alkalies it gives a dark yellowish-brown soap, easily soluble in distilled water; with phosphoric acid at first a yellowish-brown emulsion, which becomes grey and then loses its colour. Chloride of zinc forms dirty grey flocks in the liquid; and sulphuric acid an orange-yellow coloration passing through various shades of brown and red to a dark brown, the oil giving off a distinct odour of oil of bitter almonds as soon as it becomes warm. Sulphocarbonate of sodium affords an orange-yellow coloration, and acid nitrate of mercury produces no effect except when sulphuric acid is added, when the oil becomes of a clear citron-yellow colour. Bisulphide of calcium forms with the oil a granular canary-yellow soap, which subsequently loses its colour.

Peach Kernel Oil.

The same author, M. P. Guyot, gives the following tests for oil of ben (*Moringa aptera*):—Sulphuric acid colours it a golden-yellow, which quickly turns to a brown; ammonia gives a slightly yellowish-white soap, and potash a white soap; bichromate of potash turns it a reddish colour and then brown, some green flocks appearing in the liquid, which after a time and by the aid of agitation becomes yellowish-green turning to greyish-green; phosphoric acid colours it yellowish-white when shaken up with the oil; chloride of zinc gives a greyish-white emulsion; chromic acid colours it a clear brown; aqua regia a slightly greenish-white colour; nitrate of mercury gives no reaction, but by the addition of sulphuric acid the oil is coloured yellowish-white; bisulphide of calcium gives a bright canary-yellow soap, becoming yellowish-white; sulphocarbonate of sodium a greenish-yellow emulsion. When submitted to a low temperature it throws down a solid fat in a granular state and can be thus clarified. It is said to be used in perfumery because it does not soon turn rancid. This statement, however, is open to doubt. The oil possesses emetic and purgative properties. It could

Oil of Ben.

evidently be obtained as a colonial product in considerable quantities if any use could be found for it. Oil of ben should not be confounded with oil of benne, which is the name given in some American price lists to the oil obtained from the seeds of *Sesamum orientale*.

New Adulteration of Saffron.

The value of delineations of the microscopical structure of drugs is not always immediately evident. By this aid, however, Dr. Niederstadt, of Hamburg, has been able to recognize an adulteration which he recently met with in saffron and which he found to consist of tiny splinters of sandal wood. If the sophisticated saffron be repeatedly washed with water, and the washings allowed to stand, the minute splinters of sandal wood that separate out may be identified under the microscope. His examination of Barcelona and Orleans saffron, recorded in the *Archiv der Pharmacie* (p. 73), shows that the latter is considerably superior to the former. From the best Orleans saffron he obtained only 5·84 per cent. of mineral matter and 14 per cent. of water. In three samples of Barcelona saffron he found more than 14 per cent. of mineral matter and from 15 to 17 per cent. of water. He also found the saffron adulterated with chloride of sodium and glycerine, probably added to prevent the saffron losing weight by drying. The glycerine may be recognized by pressing the saffron on bibulous paper or by the greasy feel of the saffron when rubbed between the fingers. Honey, which is also used as an adulterant, is less easily recognized, since the best saffron has been found to contain as much as 13 per cent. of a sugar resembling or identical with glucose.

Pepperette.

The adulteration of pepper by what is known as poivrette or pepperette has lately attracted considerable attention in this country (*Analyst*, Feb., p. 23), and the *Daily Telegraph* (Feb. 21) devotes a leading article to the subject. This adulterant is stated in De Baudrimont's 'Dictionnaire des Adulterations et Falsifications des Substances Alimentaires' to consist of ground olive stones, and he gives figures of the microscopical appearance of the cells, which are not unlike the sclerogenous cells found in true pepper. It may be interesting to point out that another plant, the *Schinus molle*, a South American species belonging to the *Anacardiaceæ*, has a small stone fruit rather less in size than a peppercorn and possessing a somewhat similar flavour but less pungency. The fruit when ripe is a red berry, similar in shape and slightly so in colour to the pepper fruit before it turns yellow. It is not astonishing, therefore, that this plant should be confounded in Italy with pepper, and that it should not unfrequently be sent to botanists with the inquiry whether it is the true pepper plant. The name of poivrette is given in France also to the seeds of *Nigella sativa*.

Tanekaha Bark.

The tanekaha bark (*Phyllocladus trichomanoides*) of New Zealand, which was noticed at the drug sales a few weeks ago, appears to be used by dressers of glove leather to give a favourite tint to Cape and other gloves. For some years after the 1851 Exhibition, in which it was exhibited, its use was kept a secret by one firm, which enjoyed in this way a monopoly of the article, but for the last twenty years its use is said to have become more generally known (*Leather*, p. 39).

Chinese Cantharides.

The curious vermilion-coloured "cantharides" (*Huechys sanguinea*), recently offered in the London market (see *ante*, p. 608), have been examined by Mr. John Moss, who finds that although they possess a rubefacient property this is not sufficiently strong to produce a blister.

Absorption through the Skin.

A further contribution (*see* also before, pp. 346 and 427) towards clearing up the uncertainty which exists as to the extent to which absorption of medicaments takes place through the skin has been made by Messrs. Ritter and Pfeiffer (*Med. Chron.*, Feb., p. 424). The method followed in their experiments was to rub well into the extensor surface of a healthy limb half an ounce of an ointment containing the substance under investigation, then to cover the spot with a protective bandage to prevent any possible absorption by the lungs, and after twenty-four hours to collect some urine and examine it for the presence of the drug. It was found that potassium iodide from a 10 per cent. ointment passed into the urine in only one out of five cases, and this was after the ointment had been used for four days, when the skin had become irritated and its continuity practically destroyed by the prolonged action of the fatty acids derived from the decomposition of the lard. Sodium salicylate applied in the same way was never found, even in traces, in the urine; but salicylic acid invariably gave its characteristic colour test with ferric chloride within a few hours after its application. This behaviour of salicylic acid is attributed to the property possessed by it of softening the epidermis and rendering it permeable, and the extent to which this takes place is shown by the fact that if the application of salicylic acid ointment be followed by one of potassium iodide ointment the potassium iodide quickly passes into the organism and becomes detectable in the urine. When lard was replaced by lanolin it was not found that the ointment manifested any superior penetrative power. Some other experiments made to test the capability of the skin to absorb substances sprayed on to it in watery solution gave, when precautions were taken to exclude the spray from the respiratory passages, only negative results.

Oxygen in Vital Phenomena.

In apposition with the account recently given to the Chemical Society by Mr. C. J. Baker as to the behaviour of oxygen absorbed by carbon (see before, p. 680) may be placed some interesting information given by Dr. B. W. Richardson respecting the influence, under varying conditions, of oxygen in vital phenomena (*Asclepiad*, Feb., p. 71). It was obtained by enclosing mice in glass chambers containing atmospheres in which the proportion of oxygen varied with the experiment, and observing the time that lapsed before the animals became narcotized at different temperatures. It was found that, at a temperature of 55° F., when oxygen and nitrogen were present in the proportion of 1 and 4 (*i.e.*, common air) the animal became narcotized and died asleep in one hour and fifty minutes. In two parts of oxygen and three of nitrogen, as well as in three of oxygen and two of nitrogen, the animal remained free from narcotism thirty minutes longer, but eventually became rapidly narcotized and died within two minutes of the same time. But with four volumes of oxygen and one of nitrogen narcotism did not occur for two hours, and then lasted six hours before death took place, whilst with pure

oxygen narcotism was also deferred for two hours, but only lasted four hours. When an animal was placed in a vessel five times as large as those previously used, containing common air, so that the quantity of oxygen present was equal to the smaller atmosphere of pure oxygen, narcotism did not occur until after nine hours, and death after eleven and a half hours, which indicates the vital value of nitrogen as a diluting agent. In the case of the pure oxygen the larger proportion of the gas remained unchanged, and five similar experiments were made before sufficient carbonic dioxide was formed to cause asphyxia. When the temperature was lowered to 20° F. the effect was to reduce the vital combining power to such an extent that oxygen became practically an anæsthetic gas ; in pure oxygen the animal was narcotized in a few minutes and died in half an hour, whilst in common air the animal remained longer awake, but died in forty-five minutes. When the temperature was raised to 70° and 90° F., pure oxygen sustained life longer than common air in equal volume, but at 125° F. coma and death took place in fifteen minutes.

Adaptability of Micro-organisms.

In a recent Presidential Address to the Royal Microscopical Society, the Rev. Dr. Dallinger contributed some very suggestive information as to the capability of micro-organisms to adapt themselves to surrounding conditions. This was obtained whilst experimenting with "monads" contained in a medium so arranged that the temperature could be gradually altered or maintained constant at the will of the operator. In one experiment, commencing with the normal temperature of 60° F., this was raised gradually so that at the end of two months 70° F. was reached without the organisms suffering any apparent inconvenience. On the temperature reaching 73° F., however, their vitality and reproductiveness appeared to be adversely affected; this temperature was therefore maintained constant for the next two months, during which time they regained their full vigour. Then the temperature was again gradually increased until in five months more it had reached 78° F., when another long pause became necessary to allow of adaptation. The same method of slowly increasing the temperature, with intervals of pause, was followed, until at last the temperature of 158° F. was reached, when the experiment was terminated accidentally. But by that time the vital conditions had in this way been, almost imperceptibly, so altered that organisms which originally lived and flourished at a temperature of about 65° F., and would have been killed at 140° F., had become inured to withstand a temperature higher than the starting point by nearly one hundred degrees, whilst sudden reversion to the original temperature was actually fatal to them.

Large Crystals.

A novel method of obtaining fine crystals of chemical compounds which has been introduced by Dr. L. Wulff, of Gadebusch, is said to be creating considerable interest in pharmaceutical circles on the continent (*Pharm. Zeit.*, Feb. 2, p. 70). It is based upon the conclusion, arrived at on theoretical considerations, that the crystallizing powers of crystallizable bodies are exercised most favourably and uniformly in a solution that is kept constantly in motion. The method has hitherto been applied principally to such solutions as can be crystallized from metal vessels, the plan followed being to cool the solution to the point of crystallization in a suitably constructed cylinder, add some small crystals of the same compound previously warmed, and then rotate the cylinder, at first slowly, but afterwards more rapidly, continuing, if necessary, the cooling of the mixture uniformly. In this way remarkably fine and perfect crystals of sugar, red prussiate of potash and many other salts have been obtained, suitable for teaching purposes. Should there be more than one compound present and the concentration be carried to a point at which the second compound commences to crystallize out from the mother-liquor, the second crystallization, not being started upon added nuclei, separates as a crystalline powder that can be readily separated from the larger crystals.

Icelandic Jottings.

In an interesting note on the plant products of Iceland in the *Gardeners' Chronicle* (Feb. 19, p. 246) Mr. J. Wight, who has frequently visited the country, remarks that Iceland moss, although at one time used as an article of food, was recently more valuable as an article of export to Europe, and the annual gathering of the Fjallgrass was made a holiday of by families dwelling in tents *pro tem.* This statement seems strangely at variance with the remark made in 'Pharmacographia' (1879) to the effect that "none is imported from Iceland." Mr. Wight also remarks that in 1814 to 1816 whale and seal beef were eaten by the poorer classes, but with the departure of these animals from Icelandic shores the horrible disease called leprosy, but really elephantiasis, has departed also. He states that an infusion of *Achillea Millefolium* is still used as a medicinal simple, but that the bulk of the medicines in use are bought from the Apothek once a year.

Botanical Illustrations.

The collections of different kinds of woods in book form, which were shown at the Colonial Exhibition, do not appear to have been as representative as it is possible to make such specimens. According to *Leather* (p. 29) there exists at Warsenstein, in Germany, a collection of volumes consisting of blocks of different woods, in each of which the bark at the back of the volume has been removed so as to admit the scientific and common name of the tree. One side of the volume shows the natural grain and surface and the other its appearance when smoothed and varnished. On opening the book it is found to contain fruit, leaves, seeds, and other products of the tree, the moss that usually grows on the tree and the insects which feed upon various parts of it. To this is added a well printed description of the habits, usual locality, and manner of growth of the tree.

Apophysis of Mosses.

Mr. J. R. Vaizey, in a paper on the morphology of the sporophore in mosses, expresses his opinion that the curious swelling called an apophysis found below the capsule in some mosses is an assimilating and absorbing organ, and performs all the functions of a leaf, and should therefore be classed as a phyllome.

Seedling Leaves.

At the last meeting of the Linnean Society Sir John Lubbock, in the course of a most instructive paper, entitled Phytological Observations on Seedlings and Leaves, pointed out that in certain species of *Œnothera* and *Clarkia* either the base or the stalk of the cotyledonary leaves undergoes a development in which it gradually assumes a similarity of appearance to

the form of leaf peculiar to each species. Thus in species where the stem leaves are linear the cotyledons, which are at first round, exhibit an elongation of their stalks, which increase in width until they foreshadow as it were the linear shape of the future stem leaves; in other species where the stem leaves are ovate the cotyledons themselves enlarge at the base until at that part they bear a resemblance to the ovate stem leaves, although the apex of the cotyledons may still retain their rounded appearance. After describing the apparent cause of the various positions of the cotyledonary leaves in different species of *Plantago*, *Tilia*, and *Cardamine*, Sir John Lubbock called attention to the peculiar truncate shape of the leaves of the tulip tree, and demonstrated that it is caused by the way in which the leaves are folded in the leaf-buds, the apparently arrested growth of the natural form of the leaf being caused by the simultaneous development of the large stipules and the pressure arising therefrom, the stipules and the conduplicate leaves exactly fitting the one into the other in the leaf bud.

Leaf of Tulip Tree.

THE EVIDENCE FOR THE EXISTENCE OF ACID MORPHINE MECONATE.*

BY D. B. DOTT, F.R.S.E.

At a former meeting of this Society I contributed a paper† on the Meconates of Morphine, in which I described the normal meconate, and mentioned that an acid salt also probably existed. At that time there was some doubt as to the basicity of meconic acid. It was generally supposed to be tri-basic; that is, the acid was believed to contain in the molecule three atoms of hydrogen each replaceable by an atom of a univalent radical, each of these hydrogens likewise having the same function. In the case of an organic oxyacid such as meconic, this infers the presence of three carboxyl radicals in the molecule. By the researches of Dittmar and Dewar,‡ Mennel,§ Hilsebein,|| and others, it is now established that meconic acid is only dibasic though triatomic. In other words, while it contains three hydroxyl radicals it only contains two carboxyls. Whence it appears that the existence of two morphine meconates is theoretically possible. The normal or neutral meconate has been described as above referred to, and it now remains to consider whether there is sufficient evidence to prove the existence of an acid meconate of morphine.

In the identification of a substance, there is no property of so much importance as crystalline form. If a salt having the composition of acid morphine meconate, and possessing a particular crystalline formation, could be prepared, the evidence for the existence of the acid meconate would be complete. No such salt, however, has been prepared, and we have therefore to rely entirely on less satisfactory and perhaps merely negative evidence.

As it is an almost invariable, if not quite invariable, rule, that the neutral and acid salts of a base differ widely in their solubility in a given menstruum; it seemed likely that light would be thrown on the subject under discussion by the following experiments:—A saturated solution in water of neutral morphine meconate was prepared at the ordinary temperature, and then divided into two portions of 50 c.c. introduced into separate flasks. To one (*a*) 0·2 gram of morphine meconate was added, which after diligent shaking did not perceptibly diminish in bulk, showing the solution to be saturated. 0·3 gram of meconic acid was then added, and the solution well shaken. The salt did not disappear, and even after the lapse of twelve hours, and with frequent agitation, there was no appreciable diminution in the bulk of the salt. To the other flask (*b*), 0·2 gram of meconic acid was added. On standing several hours with occasional shaking, the acid was slowly dissolved. Now, if acid morphine meconate were more soluble than the normal salt the meconate added to (*a*) ought to have dissolved; while if less soluble than the normal salt the acid added to (*b*) should have caused a precipitation. These experiments, therefore, tend decidedly to prove the non-existence of the acid salt. They are not, however, absolutely conclusive, as the acid salt may exist, and yet be decomposable by water. If from a mixture possibly containing acid meconate with excess of meconic acid, a particular solvent should remove morphine and meconic acid in the proportion to form acid meconate, we would have good ground for believing that salt to exist, though it might be in a very feeble state of combination. Unfortunately, we know of no solvent which dissolves meconate and which does not at the same time dissolve meconic acid. That test, therefore, cannot be applied. What reasons, then, have we for assuming that acid morphine meconate has ever been formed? Almost the only basis for this belief is the fact referred to in my former paper, that a mixture of morphine and meconic acid in molecular proportions under certain circumstances forms an amorphous hygroscopic mass. We have, therefore, to determine whether this mass possesses any properties which cannot be explained on the hypothesis that it is a mixture of the normal meconate with excess of acid. To elucidate that question, the following experiments were tried:—

(1). Morphine and meconic acid in molecular proportions were dissolved in anhydrous alcohol with the aid of heat. On cooling, an amorphous mass was deposited.

(2). Morphine and meconic acid in the same proportions, but with 10 per cent. excess of acid, were similarly dissolved, with the same apparent result, no crystals of meconic acid being visible in the amorphous deposit.

(3). Morphine and meconic acid in proportions to form the neutral salt were dissolved in the same manner. An amorphous mass was likewise deposited.

According to the general law in such cases, this amorphous meconate is extremely soluble, but it quickly combines with its water of hydration and then crystallizes out as neutral 5-hydrate until the solution attains its normal condition of saturation. The above results, considered with those stated in former papers, render it extremely doubtful whether the acid morphine meconate really exists. There is certainly no sufficient evidence that it has ever been prepared. All references therefore, in the British Pharmacopœia or elsewhere, to "morphine bimeconate" ($C_{17}H_{19}NO_3C_7H_4O_7$) must be taken as referring to a purely hypothetical compound, which is not surely known to have a being.

* Read before the Pharmaceutical Society of Great Britain at an evening meeting in Edinburgh, Wednesday, Feb. 16.

† *Pharm. Journ.*, [3], ix., 883.

‡ 'Proc. R. S. E.,' 1869, 129.

§ *Journ. pr. Chem.*, [2], xxvi., 449.

|| *Ibid.*, [2], xxxii., 129.

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THE BENEVOLENT FUND.

IN accordance with the customary practice of drawing special attention to the Benevolent Fund of the Pharmaceutical Society once in every year, at a stated period, a list of subscribers and donors to the Fund will be found in the present number of the *Pharmaceutical Journal*, together with a statement of the relief granted during the past year, and in order to make these particulars as widely known as possible a copy of this number of the Journal will be sent to every person whose name appears upon the official Register of Chemists and Druggists. It is hoped that by this means an interest in the Fund may be excited, not only among members of this Society, but also throughout the general body of chemists. Such an expectation is justified by the circumstance that while the benefits of the Fund are exclusively confined to registered chemists and druggists they are available for all who possess that qualification, whether connected with the Pharmaceutical Society or not. As this is the period at which subscriptions are collected by the Local Secretaries throughout the country, a circular has been sent to these officers by the Secretary, requesting that when they call upon the chemists in their several districts for that purpose they will urge the special claims of the Fund to general support by all members of the trade. This personal canvass concurrently with the extended issue of the Journal with all the details of the Fund has been found advantageous in former years, and it is to be hoped that on the present occasion also the efforts of the Local Secretaries may be attended with no less satisfactory results in advancing the prosperity of the Benevolent Fund.

With the object of rendering some assistance in the same direction, it may be useful to state that during the year 1886 there were 47 annuitants who received from the Fund £1597 10*s.*, and in the same year a further sum of £631 14*s.* 5*d.* was expended in grants for the relief of cases of necessity, so that the entire amount disbursed was £2229 4*s.* 5*d.* It is a circumstance that cannot be too frequently pointed out that the very considerable assistance thus rendered is unattended by any of those heavy charges for management and official expenditure which have to be borne in the case of most other charitable organizations, and deduct largely from the amount actually available for the purposes contemplated. In this respect the Benevolent Fund of the Pharmaceutical Society is unique; for with the exception of the expenses of printing and postage, every shilling subscribed to it is applied directly for the relief of necessitous members of the trade or their widows and children, without any kind of deduction. On this ground alone the question that is sometimes asked as to the utility of the Pharmaceutical Society might be answered so as to convince the most sceptical, and at the same time so as to prove that there are ample reasons for according a more general and generous support than has yet been realized from the trade at large.

In December last six additional annuitants were elected, making the total number at the present time forty-nine, and involving an increased charge on the Fund of £205 a year. In authorizing this further expenditure the Council has trusted to the efforts which will be made by the Society's Local Secretaries to enlarge the number of subscribers and donors. The claims upon the Fund in the shape of annuities will therefore amount to £1680, and as the amount usually granted for the relief of cases of emergency usually exceeds £600 a year, the total expenditure to be met in the present year will probably amount to upwards of £2300. The income that will be received as interest upon the invested capital of the Fund, now amounting to £21,414 10*s.* 10*d.*, will be far from sufficient even to pay the present annuities, so that considerable reliance has been placed upon the subscriptions not only for the purpose of obtaining funds to pay these annuities, but also for increasing the invested capital sufficiently to admit of the annual election of annuitants being continued. It is important that these facts should be considered by every member of the trade, and it is with that object that the present extended issue of the Journal, with a full statement of the position of the Benevolent Fund, has been decided upon as a means of placing this information before every one of them.

THE PHARMACY ACT AMENDMENT BILL.

THE Pharmacy Act Amendment Bill, to which attention was directed in our issue of the 5th inst., was, on the 22nd inst., introduced in the House of Lords by the Earl of MILLTOWN, read a first time and ordered to be printed. In the notices of Bills in progress it also appears as waiting for second reading. The effort made by the Council to carry out the object of the Society by improving the system of education may therefore be regarded as being now fairly in progress so as to lead to the acquisition of the powers that are requisite for the purpose. It will not, therefore, be inappropriate to call to mind the fact that the Act of 1868 did not fully effect all that was desired by the Society for

the advancement of British pharmacy, in consequence of internal dissension. Much of the dissatisfaction that has been felt in regard to the Act of 1868 may be attributed to this influence and to the unfortunate necessity that then existed for accepting a compromise between the Bill introduced by the Society and that brought in by a rival party in the trade. It may, we think, be regarded as certain that if legislation beneficial to the interests of pharmacy in this country is to be obtained, it can only be through the instrumentality of the Pharmaceutical Society as the representative of the entire body, and, as Mr. BAILDON pointed out in his address at Edinburgh, the moral to be learnt from past experience should be laid to heart with the view of arranging any existing differences before going to Parliament. The Society has, in General Meeting, formally and thoroughly endorsed the principle embodied in the amendments of the Bye-laws that were proposed by the Council last July, and the Bill that is now before Parliament has for its object simply the acquisition of powers by which that principle may be carried into effect. The precise means by which that is to be done will be a matter for future consideration in regard to details. The obstacle to progress at the present time is merely the want of power to act and it is only to remove that obstacle that the Bill now before Parliament has been introduced.

Assuming, then, that by the passing of this Bill the Society is empowered to make such alterations in the educational system as may be found desirable, the object of those alterations will be to render the education of those who are trained for the work of pharmacy more systematic and thorough. This is surely an object which no one connected with the business can reasonably object to from the point of view of internal organization, since experience has demonstrated the insufficiency of mere examination for the purpose. Again, as regards the public functions of the Society, it is for the same reasons equally certain that there is necessity for educational improvement in order to justify the existence of the Society by ensuring the thorough and effective qualification of those whom it stamps with approval as legally qualified chemists and druggists. These are considerations of vast importance at the present time, and it is to be hoped that the arguments which Mr. BAILDON, as a member of Council, has urged in his address at Edinburgh will very generally meet with that acceptance which we think they deserve.

SCHOOL OF PHARMACY.

THE re-commencement of the courses of lectures in the School of Pharmacy of the Pharmaceutical Society will take place on Tuesday next (March 1), when Professor DUNSTAN will deliver the first lecture of a course on "Chemistry and Chemical Physics," which will continue until July. On Thursday, March 3, Professor BENTLEY will deliver the first lecture of a course on "Botany and Materia Medica," which will include Practical and Systematic Botany. In addition to these lectures Practical Instruction in Chemistry is given daily in the laboratories under the direction of Professor ATTFIELD.

Students will find the present opportunity a favourable one for commencing scientific study, for during the summer there will be a course of lectures at the Botanic Society's Gardens in the Regent's Park on "Practical and Systematic Botany," which will enable students to become practically acquainted with medicinal plants and with the representatives of the Natural Orders.

Instruction will also be given in "Practical Pharmacy and Dispensing" under the direction of Professor REDWOOD. This class, which meets for the first time on Tuesday, March 1, at 5 o'clock, when an introductory lecture will be given on "The Art of Dispensing," is conducted by Mr. JOSEPH INCE, who will lecture on Thursday and give demonstrations on Tuesday and Friday of each week at 5 o'clock, until the close of the session in July.

Further information respecting these arrangements will be found in an advertisement on another page.

The universal use of ice as an adjunct to the table in the United States has given great importance to the question how far organic impurities are eliminated from water when it undergoes freezing. Some local epidemics of typhoid fever and diarrhœa have been attributed to the use of natural ice from an infected source, and on a recent occasion the City Board of the city of Syracuse forbade ice cut from Onondaga Lake to be sold for any purpose which would bring it into contact with articles of food or drink. Resistance to this order led to an investigation by an expert, who reported that the lake was contaminated with sewage from the sewers of Syracuse, and that ice taken from it contained living bacteria of various kinds and sewage matter equal to about ten per cent. of that present in the water from which it had been formed.

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At the next meeting of the Chemical Society on March 3 there will be a ballot for the election of Fellows, and the following papers will be read:—"The Colouring Matter of Drosera Whittakeri," by Professor E. H. Rennie; "Anhydraacetinebenzil and Condensation of Benzil with Ketones," by F. R. Japp and T. Brunton; "Constitution of Glycosine," by F. R. Japp and E. Cleminshaw; "Diphenylglyoxaline and its Homologues," by F. R. Japp; "Dehydracetic Acid," by Dr. W. H. Perkin, Jun.

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The next meeting of the School of Pharmacy Students' Association will take place on Thursday, March 3, when Mr. A. Edwards will read a paper on "Volumetric Analysis," and Mr. F. J. Yeatman will give a Report on Physics.

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The next meeting of the Chemists' Assistants' Association will be held on Wednesday, March 2, when a paper on "Sanitation and Sanitary Legislation," by Mr. W. G. Blackham, will be read.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN EDINBURGH.

The first evening meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday evening, February 16, at 8.30 p.m., when Mr. H. Bellyse Baildon, B.A., F.R.S.E., Chairman of the Executive of the North British Branch, opened the proceedings with the following

Opening Address.

Gent'emen,—In the first place it is my very pleasant duty to congratulate you on the resumption of these evening meetings. As we are all painfully aware, we have had no meetings of this character for upwards of a year. Into the causes which brought about the suspension of these gatherings, or into the merits of the dispute—now, I devoutly trust, happily and finally adjusted—I shall not enter. I would only like to say that we are mainly indebted to two factors in the settlement of this matter. First to the zeal, ability and discretion with which the members of the deputation, headed by Mr. Watt, conducted their case ; and, secondly, to the time and patience devoted by the Council of the Society to the subject. As to my own endeavours in the matter, although I do not wish to be guilty of the Devil's favourite sin, "the pride that apes humility," it does not become me to speak. The point, however, on which I chiefly congratulate myself is, that I was successful in getting the question re-opened in such a way as has actually led to arrangements being made which are, perhaps, as satisfactory to both parties as either could reasonably expect, considering all the facts of the case.

What I am much more anxious about than anything that has occurred in the past is that we should as clearly as possible understand our present position, and some of the advantages it presents over the *status quo ante*. The main, and I do not hesitate to say, the enormous advantage is that now, for the first time, we have clear and authoritative recognition by the Council of the Society of a North British Branch, with a defined constitution. Whether that constitution is logically unassailable I, for one, care very little indeed, if only it prove a practical success. That will doubtless depend upon the moderation and wisdom with which the Executive and the Council of the Society respectively exercise their powers. There is one other point in which we are now in a position of vantage as compared with our former condition. I refer to the payment of the railway fares of members of the North British Executive who come from other parts of Scotland, thus giving that body every chance of becoming thoroughly representative of Scottish feelings and interests. This, with other causes, has led to a certain quickening of interest, as evinced by the very large number of candidates who accepted nomination. Unfortunately, this was not followed up by an increase in the proportion of voting papers filled up. But that may be partly due to the prolonged mental effort required to decide which twelve men were least worthy to become members of the Board. There are still important towns and districts unrepresented, and I hope the voters in these parts will not be disheartened, but will renew their efforts when the next election comes round to secure good representatives. I think a little foresight and organization should enable them to do this. I think, indeed, that every voter might well consider this aspect of the question, and allocate his votes not merely with the view of securing the return of the candidates who specially represent his or her own interests, but also endeavour to obtain a good all-round representation.

I am sure we all now cordially approve the liberal policy of the Council in purchasing this house and equipping it so thoroughly for all the purposes for which it is required, but I feel equally sure that we are very far from wishing to monopolize or restrict its benefits. I mention this because the notion has been entertained by some of our friends across the border that we did wish to do so. Now I wish once for all to repudiate this idea, which is a most mischievous one, and to declare most emphatically that these premises and all that is in them are held by the Council for the benefit of the whole Society. I would especially emphasize the fact that we shall most cordially welcome any of our friends from England who may wish to be present at these scientific meetings, or to contribute papers to our proceedings. While on this subject I am glad of this opportunity of congratulating the Assistants' Association here on its active and flourishing condition. At the same time I trust they will not forget what I may call the parent Society, and will give it every support in their power both by their attendance here and by contributions. They are they who will one day, perhaps sooner than they think, be called upon to fill our shoes, and they cannot take too early or too keen an interest in the welfare of the Pharmaceutical Society. I know there are many persons, and they are not least numerous or most reticent at the present moment, who ask, "What is the use of the Society?" Now the answer to this question depends on the view we take of its objects and functions. The best definition I can give is this general one : "The elevation of pharmacy and the pharmacist." I cannot but believe that anyone who accepts this definition and looks with open mind into the history of the subject for the past forty years but must admit that the Society has not wholly failed. I cannot, owing to the limited time at my disposal, both in the preparing and delivery of this address, enter into a lengthened *apologia* in behalf of the Society. So far as my present audience goes I feel such an *apologia* is unnecessary. But I have some hopes my words may penetrate to those dwelling as it were *in partibus infidelium*. Yet all I shall say refers only to one or two points of immediate interest. The main and prevailing policy of the Society has been the promotion of education. From the year 1852 to the year 1868 this was done by means of voluntary examinations and by the educational establishment at Bloomsbury Square, London. We must not, however, forget the scientific meetings held in London, Edinburgh, and other important centres, nor the *Pharmaceutical Journal* itself. It is due to this much criticized periodical to say that, whatever we may think of it as a weekly source of instruction and "amusement," it is undoubtedly of great value as a work of reference. It is also undoubtedly to the impulse coming from the Society that we owe the annual meetings of the Pharmaceutical Conference, and the instructive reports issuing therefrom. Now regarding all these as the results of the founding of the Society, will anyone dare to say it has failed in its aim of elevating pharmacy?

With the Act of 1868 no doubt the Society entered on a new and greatly enlarged sphere of action, and it is open to dispute whether the mutilated Bill then obtained has proved of great advantage to the pharmacist. It must always, in justice to the Society, be borne in mind that the Bill as passed by Parliament was not the Bill introduced by the Society, but, as the event seems to have proved, a somewhat unfortunate compromise between that and a measure brought in by a rival party in the trade. I do devoutly trust that the moral of this will be laid to heart, and that in future we shall arrange our differences before we go into Parliament, and not after we get there.

This brings one to what may be called a burning question,—that of the present Pharmacy Bill, which we may for convenience call the Curriculum Bill. Now it has been whispered to me by that proverbial little bird by whose inconvenient revelations we have all been at one time or other annoyed, that even in Scotland, the home of educational progress, there have been murmurs against the action of the Council in deciding to proceed

with this measure. You know the position I took at the last meeting of the Council, which is briefly this; that I thoroughly approve of the object of the Bill, while still entertaining doubts as to the policy of piecemeal legislation. My doubts were not, however, sufficiently strong to justify my opposing a measure whose object was so desirable. This object, then, is to render the education of those who in the future are trained for the work of a qualified chemist and druggist more systematic and thorough. Is this a consummation to which any one connected with the trade or profession can reasonably object? The Pharmaceutical Society, in common with every other body which has to do with examinations, has become convinced of the imperfection of mere examination as a complete and final test of knowledge and training. Does anyone dispute this conclusion? Does anyone decline to admit that one of the chief functions of the Society, indeed, the one function which from the point of view of the public welfare justifies its existence, is to see to it that those it stamps with its approval as qualified chemists and druggists shall be thoroughly and effectively qualified?

It is, I think, admitted on all hands, on none more willingly than where attacks on the action of the Society are most common, that in this respect reform is needed. There are only two ways in which the problem can be attacked, viz., by altering the examinations themselves, and by imposing a curriculum. The Society—for it must not be forgotten that a general meeting has endorsed the principle—has determined to do both. In its endeavour towards this end it has met with this obstacle, that the existing Acts of Parliament do not empower the Society to enforce a curriculum. Having arrived so far, the Council had either to abandon altogether the scheme which it was quite entitled to assume the Society had at heart, or it was compelled to apply to Parliament for an extension of powers. If the Council had decided to succumb, those who ridicule its present action would not have been backward in jeering at its impotence. The question remained of the tactics to be adopted. Were the whole of the objects which the Society desiderated to be sought in one sweeping and comprehensive measure or were the various problems to be solved in detail? The former method had already been tried without the least success. I really do not see that the Council could have persisted in that course. The Government had announced its intention of taking up the subject of the sale of poisons in a Bill of its own, and to bring in an opposing Bill would be an act of extreme folly. Really the more I think of it the less am I able to see that the Council could have taken any other course. Now supposing this Curriculum Bill becomes law, what does it amount to? It simply removes one obstacle. The details of the Council's schemes still require to be regularly passed at the annual meeting of the Society, and to be approved by the Privy Council. So there is still ample opportunity of criticizing and amending the scheme.

Let us assume for a moment that this Act is passed, and a curriculum is enforced. Who will be the worse for it? The candidates? I very much doubt it. For the chances are that a greater proportion of those who go up will succeed in passing, thus saving in time and examination fees more than they will expend in attendance and fees for classes. There is only one class of persons who may really have some adequate cause of complaint. I mean chemists in country districts where there is no opportunity for assistants taking out the necessary classes. I do not wish to shirk this difficulty, but it is hardly of sufficient magnitude to justify an abandonment of the curriculum scheme. Necessity is mother of invention, and even this may be in great measure surmounted. It is at any rate remarkable that no member of Council was found to oppose the principle of a curriculum; although on other points there is wide diversity of opinion. As to the details of the scheme, as approved by last year's Council, I may frankly say I think them decidedly open to criticism, and if I have opportunity I hope to do my endeavonr towards improving them.

I think I have already indicated one very cogent reason why the Society cannot at present bring in a Bill on the subject of the sale of poisons, viz., that the Government had announced its intention of dealing with the subject in a Bill of its own. Those persons who so noisily maintain that the Council ought at once to deal with the matter are surely unconscious of the extravagant compliment they are paying it, when they infer that it is stronger than the Government itself; these persons also seem to assume that the Council Board at Bloomsbury Square is a sort of epicurean Olympus composed of beings having no sublunary cares. I can assure the Titans who are anxious to scale this Olympus, or at any rate to discredit the present occupants, that in this respect they are mistaken; we are men even as they are, and as fully alive as they to the highly unsatisfactory nature of the existing state of the law as regards our individual interests. For the sake of argument, let us suppose that we had a free field, or were even invited by Government to frame a measure to obviate the defects of the present Acts. We all know what we consider the main defect of these viewed in the light of the notorious decision in the case of the Society *versus* the London and Provincial Supply Association, and the judgments in other less noted instances; and we are all quite prepared to suggest remedies which would be satisfactory to ourselves. This, unfortunately, is not all that is required. We must be prepared with a Bill whose principles the Government can thoroughly endorse, and whose provisions they can carry through both Houses of Parliament. We may at the outset as well assure ourselves that no Government can afford to appear in the light of a champion of the privileges of any class, especially when that class is so insignificant politically as we undoubtedly are. There is only one point of view from which the Government can or will regard the question, viz., that of the public interest and safety. I fear it is no use our pleading our hardships, nor the danger to the science of pharmacy resulting therefrom. Any measure we bring in, any proposal we make, must commend itself on the grounds of giving additional security to the lives of Her Majesty's lieges. I very much fear for instance that any proposal which went the length of altogether preventing corporations from dealing in poisons would not be entertained. But it would be very reasonable and distinctly conducive to the public safety to prescribe rigid conditions under which they should carry on such a perilous traffic, so as to secure qualified service and surveillance and to prevent *bogus* companies or individuals, in the guise of corporations, taking part in this delicate and dangerous work. Apart from any other consideration, I strongly suspect the Co-operative Store interest will prove too strong for us on this point. It is even possible that in order to secure this moderate reform we may have to submit ourselves to increased stringency of the law affecting ourselves. It is no use disguising the fact that some of the oldest, if not the wisest, heads of our order deny the wisdom of entering the parliamentary arena at all at this juncture; and one cannot help being reminded by the valiant utterances from some quarters that a certain class of persons are apt to rush in where a higher order of beings fear to tread. One thing is absolutely certain, that it is only by showing a united front that we can accomplish anything. The question remains, Under what banner can we unite? There are only two corporations which afford a rallying point, the Pharmaceutical Society and the Trade Association. If an *entente cordiale* between these two bodies could be established, so much the better; and circumstances could not well be more favourable when we have the President of one body cordially supporting the policy promoted by the executive of the other. But if we have to choose, if the chemists and druggists of the country have to choose, between the two, I think there should be no hesitation in preferring the leadership of

he Society. You are well aware I do not look upon the conduct of the Society as immaculate, but it never to my mind made so fatal an error as did the Association in defending counter-prescribing by chemists. I quite admit that, standing as we do in open shops, surrounded by an innumerable asortment of drugs, we cannot avoid expressing an opinion on their properties and merits, such as might be construed into the recommending or prescribing of medicines; something of this kind is inevitable; but I am certain the medical faculty have no wish to reduce the pharmacist to a drug-distributing machine, in which the money goes in at one slit and the medicine comes out by another. But for an Association representing, nominally at any rate, the chemists and druggists of Great Britain, formally to defend the practice of counter-prescribing is in my opinion worse than a crime, it is a mistake. A good understanding between physician and pharmacist is the only sound basis of comfort and dignity on the one hand, and prosperity and self-respect on the other. I cannot but think that charitable judgments on one side and careful and conscientious conduct on the other are capable of producing and securing an admirable relation.

We in Edinburgh have been accustomed, not without reason, to boast that this relation existed in our own case. It would be idle to ignore that things have happened not far from our doors which cannot fail to threaten these relations.

In this reference you must permit me to quote a very high authority, Sir Henry Acland, who, in his address to the pharmaceutical students in London at the opening of this session, said:—"Fear has sometimes been expressed that the highly educated pharmacist will interfere with the functions of the medical practitioners, many of whom must, in rural districts, dispense their own medicines. Experience and observation show that this is a fallacy arising from a mistaken reading of the past. The uneducated and ignorant step in where better men will not interfere. The whole tendency is in this manner to subdivision of duties. Moreover, it is not true to say the pharmacist has no concern with the action of the agents which he dispenses. Theoretically and professionally he has not. Practically he has. He dare not dispense that which he believes to be dangerous in the quantity written. Therefore, he has to know the dangerous point of all dangerous substances that are in use. He may form his opinion of the usefulness of certain agents, but he cannot, as the telegraphist does, forward mechanically whatever is ordered. A dispenser of intelligence is an observant and thoughtful person, and brings a watchful and often a critical sense to bear on all that passes through his hands."

But I am wandering from my argument, which is that if we are to rally round one banner, it must be that of the Pharmaceutical Society. Even were we united and unanimous, we are a small and, politically, insignificant class; without union we are powerless. We have the opportunity, which other classes would be too glad to get, of uniting in support of one already wealthy and privileged Society; which, if recruited by even a moiety of those eligible to join it, would become enormously more powerful; of which, if the constituency desired it, the Executive could be changed in two years sufficiently to enforce any change of policy; yet persons eligible to join the Society seem to prefer the simpler, if less effective, *rôle* of remaining outside and abusing the Executive. I would entreat those persons to come over and help us. They are welcome, I can assure them, to the sweets of power and office. I think it is Schiller who is the author of the statement that "against stupidity the gods themselves are powerless." But there is a power that is more difficult to overcome than stupidity; it is inertia. We measure a force in physics by its power of overcoming inertia. It is the inertia, the indifference of the trade at large, that is the greatest force to be overcome.

I do not mean to say that there is no room for the Society itself to move in the direction of becoming more popular over the country than it at present is. It ought, I think, to strain every nerve to distribute its benefits over as wide an area as possible; to diffuse them from as many centres. If the arrangements now made for the conduct of this North British Branch prove satisfactory, it may encourage the Society to promote the formation of other branches or sections which may stimulate interest and lead to the elevation of pharmacy in the provinces.

One mode of popularizing the Society would be by admitting "Associates not in Business" to the franchise, by giving them a voice in the conduct of the Society. It would afford an additional inducement for young men to join as soon as they passed their Minor.

In this reference I am heartily glad to note the revival of the local Society in Glasgow, under the able presidency of my esteemed friend Mr. Kinninmont, who, to judge by the voting for the Executive, is the most popular pharmacist in Scotland. The importance of such societies and meetings can hardly be exaggerated, both as promoting the higher pharmacy and in emphasizing the professional and scientific aspect of our calling. The corporation and the limited company will not dog our footsteps here; for as they have apparently no brains with which to pass examinations, neither will they enlighten us with scientific papers.

Another pleasant symptom to note is the activity of our *confrères* in Aberdeen in educational matters which has elicted a well-earned grant from the Society. This reminds me that I have hardly begun to say, and shall not be able to say, all which might be said with advantage concerning education. Some people are fond of inveighing against over-education. I have studied a good part of my life, but that is a complaint I never suffered from. I do not remember the sensation of knowing too much of any subject worth study at all. My habitual feeling is rather one of ignorance of what I ought to have at my finger-ends. Nor have I yet made the acquaintance of any person who appeared to me to know too much, even on those subjects he or she was best acquainted with. On the other hand, one has not far to go to find *imperfect* or *misdirected* education. I take it that the chief defect of education all over the country, and in all departments, has been on the technical or practical side. That is a point we must especially look to. Our calling is an art or craft quite as much as it is a trade or scientific profession. A man is valued and remunerated not according to his theoretical knowledge but his practical power of using it. Technical skill is what everyone, from the Poet Laureate to the shoe-black, must have in order to produce any result. If we only keep education sufficiently practical; if we produce a technique in proportion to our head knowledge, we need not fear over-education. I believe myself that the most important part of a pharmacist's training is his apprenticeship. The methods and habits acquired then determine a man's style of work for the rest of his life. I therefore hold that the term of apprenticeship should not be less than four or five years, and that no apprentice should be bound till he has passed his Preliminary examination, because until he has done so he cannot devote his attention to the technical and scientific aspects of his work. I confess I find a difficulty in understanding the large percentage of failures in this simple and restricted examination. I am inclined to think more would pass if it were less restricted. If, for instance, a few extra alternative subjects were added, such as an elementary knowledge of French, German, mathematics or mechanics, all of which are extremely useful departments of knowledge to the modern pharmacist, those who had special gifts in these directions would be able to produce a more favourable impression on the examiners than they now do.

I fear my address is like that extraordinary weapon the boomerang which always returns to the point it started from and that I am continually harking back to the subject of education. But I do so because I think

at the present moment we are all of us apt to be a little distracted from the subject by what appear to be more practical questions. Nor do I think I can too greatly emphasize my statement that over-education is all but, if not altogether, an impossibility. Some of you may say that the actual bread-and-butter question is the more essential. Now I say this, that the better a pharmacist is educated the surer he is in the end of being supplied with bread and butter, if not with something nicer. Even taking the worst case of all, where a pharmacist fails to make a living in his own business; the more thorough his education, the more likely is he to find some other means of livelihood in connection with those sciences with which he is already familiar. But I go further, and I venture to say that it is not, as a rule, the best educated pharmacist that succumbs in the struggle for existence, but rather those who were registered without examination. It is notorious that these persons and their widows and children hold a very prominent place among the applicants for relief from the Benevolent Fund of the Pharmaceutical Society. There will always be exceptions to every rule, and there may be cases in which an accomplished pharmacist remains unappreciated by his townsfolk. But it certainly will not be on account of his superior education that he is neglected, but through some other cause. One element I will admit may operate against him. He will probably take a higher view of his position and responsibility than a less educated man, and will therefore be less capable of stooping to anything approaching puffery or quackery; arts which, alas, in this world and age are so apt to be crowned with success. He may be in a sense just a little over-conscientious; just a little too eager to disillusionize the public on points on which it seems greatly to prefer being continually duped. He consequently suffers, as every man who does not take Solomon's advice against being over-righteous will suffer this side of the Millenium. With all this, if I may be pardoned the use of a sporting phrase, Education is the horse I would put my money on; nor would I hesitate to back, taking a sufficient number of cases, the examined man against the unexamined man, the Major man against the Minor man, for success in life. There is nothing to my mind more regretable than the small number of our men who go up for the Major examination. The question, What is the use of it? I think I have already indicated the answer to in my remarks on education. There is another point which is too much left out of account, viz., that the title of pharmaceutical chemist is thoroughly protected even by the present Acts; whereas it is much more difficult to secure the title of chemist and druggist or close approximations to it for the use of qualified persons only. With regard to individuals of course this can to a large extent be done, but as we all know to our cost, corporations and companies are not so easily dealt with. If the neglect or defect in the Act had been noticed sooner, before the system of Co-operative Stores had grown to its present dimensions, the matter might very simply and easily have been put right to our satisfaction. Doubtless the Pharmaceutical Society of Victoria has lately scored a great success in getting its Act amended. But I strongly suspect the opposing interests were there much weaker than with us. While I by no means despair of an inprovement in our present Acts in the direction of greater security both to the public and the pharmacist, I feel certain that by far the greatest security we have lies in the direction of educating ourselves and in educating public opinion. This latter is certainly a slow process, but from all I can learn we in Edinburgh are receiving assistance from an unexpected and not very welcome quarter. For if even a part of what one hears be true, the companies of unqualified persons professing to practise pharmacy in our neighbourhood are rapidly and surely demonstrating to the public the superiority of the registered and qualified pharmacist over a congeries of persons ignorant of that business or profession.

Perhaps the chemist and druggist is next to the landlord the best-abused person at the present time. We are held up to execration as extortioners and monopolists. To this first charge this is no place to reply at length. I would only ask that before these accusations are made or believed the subject should be not partially, but thoroughly examined. Not merely the gross profit, which is high, but the net profit, and the actual income cleared, must be taken into account. Then the really terrible responsibility of working with materials which in their way are as dangerous as gun-cotton and dynamite must be allowed for, as the risk of ruin by the least misadventure. Nor must it be forgotten that this class has sunk considerable capital in time and money in education, Persons who have not done this, looking on from the outside, think the whole affair very easy and profitable. They form a company in order to evade the action of the Pharmacy Acts, and then proceed by a sort of Chinese cheap labour to supplant the qualified pharmacist. They invest their capital not in education but in advertisements, and expect a better percentage on their outlay. Great is the power of puffery, but I doubt if it will persuade the intelligent public of Scotland that ignorance is better than learning, and interested assertion more trustworthy than long experience. In point of fact no sane persons will go on day after day putting their lives at the mercy of persons who have no visible or tangible credentials. There is a certain official register of the qualified chemists and druggists and pharmaceutical chemists of Great Britain, which if the public were alive to their own interests they would occasionally consult. There will be found the names of all individuals legally qualified to practise pharmacy in all its branches. That volume is newly published, and I feel sure the Assistant-Secretary will be happy to show it to any inquiring spirits. One general remark I would like to make, that I think it is manifestly unfair to apply to us the term "monopolists." If we are monopolists so are the members of every one of the professions; so are certificated teachers; so are all persons who are asked by the Government to show their fitness to discharge the offices they undertake. The only bar in any man or woman's way are examinations, such as any person of moderate ability and diligent application can certainly pass. These examinations are carefully watched by the Privy Council's visitors both in England and in Scotland. The candidate may go to either of the boards. He may return to the charge as often as he likes. So little practically does this constitute a monopoly that the trade is already overstocked. I know several very able young pharmacists who have gone to India and the colonies because their prospects at home were so gloomy. Does this look like a monopoly? But then any stick will do to beat a dog with, especially when you covet his bone. We have of late been so subject to attack that I thought a few words of defence might be permitted on this occasion, if it were only that we might start this session with some little remnant of self-respect.

If I were asked what one alteration I would make on the Pharmacy Acts, I should really have some hesitation in saying. While I am certainly of opinion in the interest of public safety the carrying out of the principle of individual responsibility is of high importance, there is an evil which to my mind is almost as great. I mean the exclusion of patent medicines so called from the regulations for the sale of other poisons. I find it difficult to get the public to believe that any drug, however deleterious or dangerous, may be sold by any person (paying a patent medicine licence), under cover of the Government stamp. Yet it is undoubtedly the fact. Take the distressing case in London the other day where a man applied to the magistrate for advice. His wife had become a chlorodyne drinker, and was ruining him and herself by the habit. He went round the chemists and asked them not to supply her. They agreed, but she continued to purchase it at the stores. Now if that medicine had been in the poison schedule, where it ought to be, those who sup-

plied her without knowing her would have been breaking the Act, and the poor man would have had some protection. As it is, any child may be the actual seller. I cannot help thinking that by withdrawing the exception in favour of proprietary medicines, and leaving it to the seller to secure himself by getting written guarantees from the makers, and also, when he has any cause to suspect, by making analysis himself, the public safety would be increased, and the dealing in these articles taken out of the hands of ignorant and unqualified persons. I say it will be a scandal if the Government do not deal firmly and boldly with this question in its Poisons Bill.

There are many tempting subjects, and even some burning questions, which I cannot possibly touch to-night. Among such questions, that of the decision of the Sheffield stipendiary is prominent. I do not agree with the Editor of the Journal in all he says on those decisions. At the same time, it appears to me rather the part of the Medical Council to move in the direction of getting their publication accepted more generally as a standard, and not the function of the Pharmaceutical Society.

One point I must not omit to touch on. There is an impression abroad that the Council of the Society is not sufficiently active in the prosecution of offenders against the Pharmacy Acts. I held that opinion myself. My increased knowledge of the subject has caused me to modify it. The truth is, the Act puts the responsibility of prosecution on the Society, but provides no adequate machinery for enforcing it, and is, in itself, about as unworkable a piece of legislation as Parliament in its wisdom ever passed. Not even the Food and Drugs Act, the inutility of which I pointed out years ago, can be more futile. The cases brought before the Council are chiefly of two classes, miserable hucksters or half-broken tradesmen or their widows, who are not worth powder and shot, or, on the other hand, smart and unscrupulous persons, probably acting under clever legal advice, who are apt to get the better of the Society and thus secure a splendid advertisement for themselves. Now, the Council neither cares to drive needy wretches to extremity and appear in a brutal light, nor does it desire to promote high dividends in unqualified companies. The very fact of the Society being the pursuer often seems to me to prejudice the Judge against it. He is so apt to look on it as an attempt to protect not the public, but a monopoly.

I am not afraid to mention even the unfortunate Judd case. Attention was drawn to the case by persons in the same town as Mrs. Judd's business was carried on in. The Solicitor advised the Council that Mrs. Judd was not entitled under the Act to continue in business. The "qualified assistant" was by this time Mrs. Judd's son-in-law; it was thought a little pressure would cause that lady to hand over the business to this person. A correspondence lingered on for months. All sorts of apparently frivolous delays and excuses were made. The Council began to think the issue rather a fine one, and instructed the Solicitor not to proceed if he got promise of expenses, and delayed consideration for a month. In the meanwhile the lady plucked up courage—declined to pay anything. The Solicitor went on with the case, which was lost. Then went up a great shout of execration against the Council. They had been "persecuting a widow." It is very easy to make these *ex post facto* condemnations. It is much less easy to administer an Act, the main principle of which is traversed by that most unfortunate, yet popular clause, known as "the widow's." So long as we allow a Trust to carry on business through a qualified assistant, how can we legally object to a company doing the same?

I must really apologize for this rambling discourse. I had no intention of saying more than a few words at the opening of this session. It had never entered my head that I should be called upon to make a formal address till it was strongly, almost imperatively urged upon me by some of my colleagues of the Executive here. I had to attend the Council meeting the first week of this month. It was the second week of the month before I could make a beginning. Had I had a month or two in place of a little over a week I might, I flatter myself, have written a fairly interesting address.

All I can say to you to-night is to exhort you "not to be weary of well-doing;" not to abandon a high ideal of pharmacy; not to desert the cause of a wise and balanced education; not, in a word, to haul down the colours which have flown for upwards of forty years from the mast-head of our Society.

Mr. Gilmour said in the able address to which they had just listened Mr. Baildon had touched upon a variety of topics very judiciously, and with admirable discretion. He was very pleased to think that they had reached a settlement of the points which had been in dispute for some time, and had been able to resume the evening scientific meetings under the chairmanship of one so well qualified as Mr. Baildon. It was very important that they should keep themselves well to the front, so as to maintain that confidence and sympathy on the part of the medical profession which had happily always existed in Edinburgh. He thought it was desirable to emphasize the statements made by Mr. Baildon as to the great importance of thorough education on the part of pharmacists, and agreed with his suggestion that in the Preliminary examination a greater choice of subjects might be permitted with advantage. He had much pleasure in proposing a cordial vote of thanks to Mr. Baildon for his very appropriate and thoughtful address.

Mr. J. L. Ewing heartily seconded the motion, and agreed with Mr. Gilmour as to the graceful and eloquent way in which Mr. Baildon had addressed them. He had always looked upon Mr. Baildon as one who set a good example to them as pharmacists. From the absorbing nature of their calling, they were apt to become the victims of a certain narrowness of view. Mr. Baildon had shown how they might cultivate greater breadth and depth of view by travelling into other regions such as poetry, philosophy and natural science. While he agreed with the greater part of what had been said by Mr. Baildon, there was one point which he specially desired to have prominently brought forward. It was a point of very great practical importance. He entirely endorsed Mr. Baildon's views as to the necessity for maintaining a high standard of education on the part of pharmacists, but there was another question which more immediately affected them from a practical business point of view. He referred to the dispensing and sale of poisons by bogus companies and other unqualified traders. He believed such a system of trading would ultimately find its level and terminate, but, nevertheless, it was a question of great urgency in the interest of the public safety, quite as much as in the interest of the duly qualified chemist and druggist. He thought the present penalty for an infringement of the Pharmacy Act was not sufficient to deter unscrupulous parties from running the risk of a conviction. He believed that the fine for illegally acting as an attorney was something like £50, and he would suggest that the penalty for illegally acting as a chemist and druggist should be very considerably increased. He would like, in this connection, to address a few words to those who, like himself, belonged to the younger members of the pharmaceutical craft. They must all be gratified at the great improvement which had taken place during the last twenty years. Their hours were shorter, and they had more holidays, thus affording opportunity for self-improvement and healthful recreation. He felt convinced that those corporations to which he had referred would have little consideration for the dispenser, and short hours and holidays would be conspicuous by their absence. He would therefore advise all the younger pharmacists to seek the higher tracts of their profession, and refuse to pander to a system which must inevitably lead to the destruction of all true pharmacy. It would be the wisdom of all

pharmacists to hold their heads high, and not be too much down-hearted, and he trusted that this institution would long continue to be a lighthouse to the pharmacists of Scotland.

The vote of thanks was awarded with acclamation.

Mr. Baildon, in reply, said the subject referred to by Mr. Ewing was undoubtedly a very crying one. The principle involved in this system, which practically defeated the main purpose of the Pharmacy Act, was one which must reduce the practice of pharmacy to the very lowest level. Ht thought this would be discovered by the public, and there was some hope, therefore, that the evil would not increase. That the principle was false was clear from the fact that it did not take into account the high skill and great responsibility, together with the special education and training of the pharmacist, which were insisted upon by the Legislature as necessary to secure the public safety.

Mr. D. B. Dott, F.R.S.E., then read a paper on "The Evidence for the Existence of Acid Morphine Meconate," which will be found on page 690.

The Chairman, in moving a vote of thanks to Mr. Dott, said that the paper dealt with a purely scientific and technical subject, which was, perhaps, beyond the reach of immediate criticism. He had seldom listened to a clearer or more complete piece of scientific reasoning, and thought it a valuable contribution towards the settlement of a doubtful point.

Mr. J. B. Stephenson, in seconding the motion, said they were all at one as to the spontaniety and heartiness with which they thanked Mr. Dott, and any criticisms might be reserved till such time as they had an opportunity of considering the paper when it appeared in the *Pharmaceutical Journal*. He regarded the Chairman's address and the valuable communication by Mr. Dott as a highly favourable omen.

A number of donations to the museum were exhibited, and were briefly referred to by the Assistant-Secretary. They included a Kombé poisoned arrow kindly lent by Messrs. Burroughs, Wellcome and Co., who also sent a specimen of strophanthus follicles. There were also shown samples of greenish-brown and white strophanthus seeds and the seeds of a new species, *Strophanthus hispidus acera*, sent by Mr. E. M. Holmes; and also a specimen of immature strophanthus follicles presented by Professor T. R. Fraser. In connection with this subject it was pointed out that there was a want of uniformity at present in the strength of tincture of strophanthus. Some chemists were still dispensing the 1 in 8 tincture, others dispensed the new 1 in 20 tincture, and others again who had a stock of 1 in 8 tincture had diluted it to 1 in 20. It was pointed out that, according to the statements made by Mr. Martindale, in the latter case the 1 in 8 tincture should be diluted to 1 in 16 only to correspond in strength to a 1 in 20 tincture made from the seeds, and it was also suggested that a uniform practice in the dispensing of so powerful a remedy was very desirable. Two specimens of adulterated drugs were presented by Mr. C. A. Macpherson. These consisted of a sample of serpentary rhizome and squill bulb. The former was of good quality, but contained a very large proportion of the stems, leaves and fruits of the plant. Apparently the whole herb had been pulled up and it also contained a small proportion of the rhizomes of *Hydrastis Canadensis*. The squill was of fair average quality, containing some of the red variety. The adulteration consisted of pieces of gypsum about the size and appearance of the slices of squill and not readily detected. Messrs. T. and H. Smith sent a mass of lead weighing 6¼ ounces which had been found in a ball of opium.

The Chairman having intimated that it was proposed to have the next evening meeting on March 16, when they expected to have various communications, including some notes by Mr. Gilmour, the meeting was closed.

Proceedings of Societies in London.

ROYAL INSTITUTION.

Genesis of the Elements.

Only a few weeks ago, in a lecture delivered at the Royal Institution, Sir W. Thomson, looking back an imaginary period of twenty million years, pictured the moment immediately before the birth of our sun, but on Friday last, Mr. W. Crookes, in lecturing upon "The Genesis of the Elements," asked his audience to accompany him back to a period more remote. The lecture, which is partly a recapitulation of the lecture before the British Association at Birmingham last year, is not suitable for abstraction, as it consists of an enumeration in minute detail of various phenomena tending to throw a doubt upon the simple nature of the commonly received elements. It will therefore be sufficient to notice here some of the more prominent features of the phenomena observed and the conclusions drawn from them by Mr. Crookes, pending the publication of the lecture *in extenso*. In the distribution of the chemical elements two very distinct cases are apparent. In one instance bodies are observed grouped in definite proportions with other bodies of a diverse nature, to which they are attached by more or less affinity. In the second case bodies associate themselves with other bodies more or less closely allied to themselves, and often almost identical in atomic weight. The latter are not combined in any definite proportions, nor held together by any decided affinity, and the difficulty of obtaining one or more of the component bodies in a separate state lies not in the strength of the affinities to be overcome, but in the circumstance that any reagent employed acts upon each of the substances in an almost similar manner. The most striking instance of such association is found in the metals of the so-called "rare earths," which, grouped together in a few minerals such as samarskite and gadolinite, are occasionally found in a few localities. Their separation can only be effected by a process of chemical fractionation, in which a slight difference in the behaviour of the constituents to some reagents is taken advantage of to effect a partial separation, until by continued retreatment they are obtained in a state of relative purity. Thus in dealing with two earths almost identical in their properties, but differing slightly in their basicity, Mr. Crookes suggests that to a very dilute solution of the earths weak ammonia be added to an amount sufficient only to precipitate one-half of the bases present. Upon filtration, two parts are obtained no longer identical in composition, and the minute difference can be made to accumulate systematically until it becomes perceptible either by chemical or physical tests. One of the most delicate tests yet introduced for the determination of the presence of any of these rare earths is that designated by Mr. Crookes as the radiant test. Although a vessel containing no solid or liquid body is generally spoken of as "empty," yet the incorrectness of the statement was made very apparent by Mr. Crookes when he showed to his audience a glass tube of a capacity of 5 cubic centimetres exhausted to one fifty-millionth part of an atmosphere and yet computed to still contain about one hundred million million molecules. But still with a vacuum of one millionth of an atmosphere certain substances under the action of the induction spark phosphoresce, and the examination of the spectra of these phosphorescing earths constitutes the test introduced by Mr. Crookes. With the application of the test several earths were shown to differ in their phosphorogenic properties and also in their power of retaining residual phosphorescence. By means of the fractionation before referred to Mr. Crookes has been able to split yttria up into several bodies, each of which gives a slight variation in the phosphorescent spectrum, but the electric spark spectrum of any of which differs not in the slightest from what is found in the original yttrium. For the explanation of these phenomena two theories are

put forward, one suggesting that there is a structure of the molecule of yttrium similar to that of the benzol ring, and that its components slightly differ from each other according to their position, but that in the intense heat of the electric spark, the little differences of molecular arrangement vanish. The alternative theory introduces a number of new elements which have not yet been obtained in a sufficiently pure state of separation to distinguish their spectra. Amongst other arguments Mr. Crookes brought forward to favour the theory that bodies now regarded as absolutely simple and elementary may be split up, he referred to recent decomposition of didymium into two simpler bodies, neither of which can claim to be ultimately simple bodies. These results the lecturer considered to show not that a number of new elements had been discovered, but rather that the very idea of an element, as something absolutely primary and ultimate, seems to grow less and less distinct. He provisionally concludes that our so-called elements or simple bodies are, in reality, compound bodies, and the matter which existed anterior to our elements he proposes to name *protyle*. This protyle he considers has been converted into the atomic condition by the same tendency that all amorphous matter has to aggregate, and under a process analogous to cooling the protyle was converted not into only one kind of matter, but many. The first-born element would be most nearly allied to protyl, and this is hydrogen, of all known bodies the simplest in structure and of the lowest atomic weight, and the interval between the formation of two elements would determine the atomic weight, affinity and chemical position of the new element. In this genesis of the elements the longer the time taken up by the cooling down process the more sharply defined would be the resulting element, whilst with a more rapid or irregular cooling the resulting bodies would fade into each other by almost imperceptible degrees. Mr. Crookes explained his theory fully with the aid of a modification of the diagram designed by Professor Reynolds to illustrate the periodic law.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, February 17, Mr. E. G. Baker, Vice-President, in the chair. The proceedings commenced by the reading of the following paper :—

Atoms.

Based on Stallo's Concepts and Theories of Modern Physics.

BY WALTER H. INCE.

In these days of high pressure and rapid learning too much is taken for granted and too little thought is given to analyse theories on which depend great issues. "Theories," as Tyndall* remarks, "are indispensable, but they sometimes act like drugs upon the mind. Men grow fond of them as they do of dram drinking, and feel discontented and irrascible when the stimulant to the imagination is taken away."

In this question of atoms we must remember the value theories have been, and are, to chemical science ; by the concepts we may predict bodies, explain isomers and metamers by different groupings of atoms ; they are indispensable both to the synthetical and analytical chemist ; in fact the atomic theory taken as a whole is a valuable working hypothesis.

Bearing this in mind I will adopt the sceptical method of examination, which is postulated by Kant† in his 'Critique of Pure Reason,' as follows :—

"This method of watching, or rather originating, a conflict of assertions, not for the purpose of finally deciding in favour of either side, but to discover whether the object of the struggle is not a mere illusion, which each strives in vain to reach, but which would be no gain even when reached—this procedure, I say, may be termed the sceptical method. It is thoroughly distinct from scepticism—the principle of a technical and scientific ignorance which undermines the foundations of all knowledge, in order, if possible, to destroy our belief and confidence therein. For the sceptical method aims at certainty by endeavouring to discover in a conflict of this kind, conducted honestly and intelligently on both sides, the point of misunderstanding."

In the ancient conception of the atom we have much to smile at, but those who live in glass houses must not throw stones. When we read that the properties of honey are due to the smooth, and of vinegar to the rough atoms, we feel inclined to throw ridicule on the ancient philosophers ; but what have we substituted in its stead? We have the atom likened to a whalebone balloon, or to a bell with a clapper hung on a spiral spring.* Picture to yourselves an atom, that is an indivisible particle, in the shape of a bell. Then lastly we have an elastic atom, which would make the ancients smile in their turn.

In the writings of Lucretius we have fundamentally the same concepts of the properties of the atom as at the present time. We read as follows†:—"Primordial atoms are therefore of pure solidity, which, composed of the smallest points, closely cohere, not combined of a union of any other things, but rather endowed with an eternal, simple, and indissoluble existence, from which nature allows nothing to be broken off, or even diminished, reserving these primordial atoms as seeds of her productions." Again (lib. i., line 623), "You must be prevailed upon to acknowledge that there are bodies which exist having no parts, and consist of the least possible substance ; and since they are so, since they are indivisible and undiminishable, you must also concede that they are solid and eternal."

In the second book the germs of the kinetic theory may be seen, the passages are too long to give *in extenso*, but I will quote a few of the most striking :—"The atoms driven by perpetual and constant motion part when struck by other atoms, rebound to a great distance ; and whatsoever particles being brought together in a more close congeries rebound only small distances, these form the strong substance of rock, and the rigid consistence of iron, and a few other things of their kind, and of similar hardness. Other particles again, which wander through the vast void of space, fly, when, struck, far off, and rebound away to great distances, these supply us the thin air and radiant light of the sun."‡

But unfortunately when Lucretius wanders into speculation concerning the shape of these atoms he contradicts himself ; his particle may be jagged, rough, hooked, or globose ; he says,§ "There are some atoms also which are neither justly thought to be rough or smooth, nor altogether hooked with bent points, but rather furnished with small angles slightly jutting out, which have power rather to titillate the sense than wound it ; of which kind of atoms consist pickle and the taste of elecampane." Here we have a view of an indivisible atom, a body consisting of no parts having bent or hooked points, rough, or with angles ; a direct contradiction of his definition in the first book, for an angle must consist of more than one part.

If we allow that these ultimate particles are indivisible, being the smallest portions of matter that can be divided by physical means, it follows that they are absolutely hard and inelastic ; hard, because they are unable to be penetrated or divided ; inelastic, because "elasticity is the property in virtue of which bodies resume their original form or volume, when a force which altered that form or volume ceases to act,"‖ and a body which could be altered

* Tyndall, 'Heat as a Mode of Motion.'

† Kant, 'Critique of Pure Reason, Transcendental and Dialectic.'

* Professor Clifford, 'Atoms.'

† Lucretius, 'De Re. Nat.,' lib. i., l. 610, *et seq.*

‡ *Ibid.*, lib. ii., l. 96.

§ *Ibid.*, lib. ii., 420.

‖ Ganot's 'Physics.'

or modified in shape would not be of a simple, but a complex structure, having at least two parts to be acted upon. Such was the view entertained in earlier times, but recent theories, more especially that of the kinetic theory of gases, entirely denounces the theory of rigid, hard and inelastic atoms, and advocates the claim of perfectly elastic atoms, gases being filled with rapidly moving atoms which are for ever colliding with each other.

Unless these atoms composing the gas were perfectly elastic, the motions would gradually become slower, and eventually cease, owing to loss of energy, for when two partially elastic bodies meet, such as two billiard balls, loss of motion is accounted for by the change of external to internal motion.

Here we have two theories, diametrically opposed to each other. To which are we to pin our faith? And what is the outcome of them?

In the first proposition (that of the indivisible, unchangeable and indestructible atom) we account for the indestructibility and impenetrability of matter, expansion being the increase and contraction the decrease of the space between such particles.

Each atom is supposed to have a definite relative weight, and also a definite power of combination.

The indestructibility of matter is proved chemically, for neither analysis nor synthesis can take away the weight of any body acted upon. Take any quantity of zinc, oxidize it, dissolve it in acids, act on it in any way you please, still the same quantity of metal exists in the various combinations, and may be extracted therefrom.

And yet this quantity is simply relative, take it to the top of a mountain and the weight will be relatively the same, but change the form of balance and the weight will be lessened.

This constancy in weight (on which the indestructibility of matter is founded) is only a constancy, if the relations are the same.

Next we come to impenetrability, *i.e.*, that two bodies cannot occupy the same space. This formulates that there is a certain limit to compression of all substances; in the case of solids and liquids there is a point which, with our limited means, we cannot further compress; yet the simple admixture of water and alcohol occupies less space than if separately subjected to the greatest pressure known.

Thus it would seem that neither indestructibility nor impenetrability of matter can be experimentally proved by the theory of "atomic" structure of matter.

The only fact we know is, that all things being equal, certain fixed quantities of elements unite with each other; thus as Sir William Thomson has said, "The assumption of atoms can explain no property which has not previously been attributed to the atoms themselves."

We next come to the second concept of an atom, the elastic atom of perpetual motion, which accounts for the fact that the volume of a gas is inversely as the pressure and proportional to its temperature.

It rests on the hypotheses—

1. That a gas is composed of solid particles which are indestructible, and of constant weight and volume.
2. That these particles are absolutely elastic.
3. That they are in perpetual rectilinear motion.

The contending arguments may be briefly summed up thus:—That in experience no perfectly elastic body is known, nor bodies ceaselessly moving without attraction or repulsion till on the verge of collision.

Here in a condensed form are both concepts of the atom shown, each equally overthrown by the other side, the "atom" to the chemist being what the enigma "life" is to the biologist.

But the knowledge of the nature of "life" does not in any way hinder probable and plausible theories for the propagation and evolution of the various species which inhabit the earth.

Let "life" be taken for granted, be it from "bathybios," "amœbæ," or "monera;" and the rest is comparatively easy.

So with the "atom;" let us accept the atom as a something, beyond which matter cannot be divided; an indivisible particle, the nature of which at present is unknown; and starting with this something, let us use it to its greatest advantage possible, keeping in mind, not so much its theoretical but its practical value.

On this subject we may well recall to our minds Carlyle's* saying that "Science has done much for us, but it is a poor science that would hide from us that great deep sacred infinitude of Nescience whither we can never penetrate, on which all science swims as a mere superficial film. This world, after all our science and sciences, is still a miracle; wonderful, inscrutable, magical, and more, to whosoever will think of it."

After a discussion on the above paper, a Report on Practical Pharmacy was made by Mr. F. C. J. Bird, the subject being Alcohol. The reporter first touched on the manufacture of alcohol, and gave one or two simple tests for its freedom or otherwise from fusel oil and other impurities, but devoted the main portion of his report to the comparative strength of alcohols, and the meaning of degrees over or under proof. Alluding first to the difficulty of obtaining really absolute alcohol, and giving examples of the different specific gravities arrived at by successive observers, down to Squibb's of ·7935, the lowest yet obtained, he proceeded to show by a table and diagrammatic curve the contraction that takes place on mixing it with water in varying proportions. The method of expressing the strength of alcohol in terms of proof spirit was then explained, and it was shown that much misconception prevailed on this point, the definition given in the United States Dispensatory being instanced as quite erroneous. The matter was put in a very simple and intelligible light by means of coloured diagrams, and the practical convenience of this system in fortifying or diluting alcohols to any required strength was shown. The report was illustrated by the hydrometers, etc., used for ascertaining the strength of alcohol, and by examples of the calculations necessary in adjusting the strength of spirit recovered by distillation in pharmaceutical operations. A sliding rule was also shown which is very useful for saving the labour of calculation, as it enables any number of volumes at one strength to be converted at a glance into an equivalent number of volumes at any other strength. It consists of three narrow rules placed side by side, the two outer being firmly bound together at the ends by brass bands, whilst the inner one is capable of sliding freely between them. The outer rules are graduated on their inner edges in unequal divisions representing volumes, the numbers in an ordinary size ranging from 10 to 180. The sliding portion is also graduated on both edges in a scale of unequal divisions representing degrees over or under proof (from 68 under proof to 70 over proof). To use the instrument the central rule is moved along until the graduation mark representing the given strength is coincident with the graduation on one of the outer scales representing the given number of volumes, when the number of volumes at the strength sought will be found on the outer scale exactly corresponding to the degree denoting that strength on the inner scale.

The report gave rise to a discussion, in which the Chairman, Secretaries, Messrs. E. White and E. J. Woolley took part, after which the meeting adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the Chemists' Assistants' Association was held at 103, Great Russell Street, on February 16. Mr. J. F. Burnett, F.C.S., Vice-President, occupied the chair. After the preliminary business had been disposed

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* Carlyle, 'Heroes and Hero Worship.'

of, the Chairman called upon Mr. Thompson to read a paper on "Pharmaceutical Soaps."

In opening his paper, Mr. Thompson said that he found most of the work on pharmaceutical soaps had already been dealt with by former workers, specially referring to a paper by Mr. Dechan, and a later one by Messrs. Dechan and Maben; the results obtained by these gentlemen, more especially the analytical figures, were referred to and commented on at some length.

After describing the methods by which the various soaps of the Pharmacopœia were made, and pointing out that one of the most important matters the chemist had to ascertain was the absence or otherwise of any appreciable quantity of free or uncombined alkali, Mr. Thompson proceeded to discuss the various methods in use for the determination of free alkali in soaps.

Two processes were dilated upon, viz., the "salting-out process" and the "alcohol test." The first of these consists in taking a known weight of soap, dissolving in water, and adding to the solution, either a definite volume of saturated brine, or a known weight of NaCl, which has the effect of precipitating all the soap (so long as no large percentage of cocoanut oil soap be present). The solution is then filtered, the curd washed with brine, and the filtrate titrated in the usual manner. The second process is worked by dissolving a known weight of soap in alcohol, filtering through a hot funnel, washing the residue with hot alcohol, and finally titrating with cochineal both the filtrate and the solution obtained by dissolving the residue on the filter in water; the algebraic sum of these two results gives the total free alkali.

This latter process was recommended as the most reliable, the former being rendered inexact owing to the "hydrolysis" of a certain amount of the soap.

The analyses of various soaps examined were then discussed, Mr. Thompson stating that he had only found one specimen out of several free from uncombined alkali.

In conclusion, it was pointed out that the B.P. tests should be made more stringent, especially in the case of *sapo animalis*, and that an absolutely neutral soap should be insisted upon for use in all pharmaceutical preparations.

After the reading of the paper a long discussion took place, of which the following is an abstract:—

Mr. T. S. Dymond asked whether Mr. Thompson did not consider that the practice of precipitating soap by the addition of strong lye tended to contaminate the product with excess of alkali. In the hydrolytic decomposition the author had described, he would have anticipated that either the free alkali would have prevented such a phenomenon, or that the fatty acid would have been separated from the solution as such. He should be glad to hear what colour changes cochineal underwent when used as an indicator.

Mr. E. J. Millard thought the presence of alkaline carbonate in soaps was rather an advantage than otherwise, its chief effect being to soften the water used in washing. There were certain proprietary powders largely sold for effecting this object, and they all owed their properties to alkalies. He considered it rather premature to insist on a standard alkalinity for all soaps.

The Chairman, referring to the *sapo durus* of the late Pharmacopœia, stated that lin. pot. iodidi c. sapone used to show up well the differences in commercial samples of hard soap. He had never succeeded in preparing a satisfactory liniment, except when he used a pure soap made from olive oil and soda. He thought the solubility of the soap in spirit, mentioned in the Pharmacopœia, a good test, as it readily indicated contamination with carbonates and sulphates. There had recently been much discussion on the new lin. terebinthinæ. Perhaps Mr. Thompson could tell them how it was that one man makes a thin liniment and another a jelly. With reference to the last speaker's criticism he agreed with Mr. Thompson that soaps for pharmaceutical use should be free from alkali, but hought it unnecessary for washing purposes.

Mr. P. MacEwan said he had often prepared lin. pot. iod. c. sapone when he was a junior. He remembered a patient bringing a prescription that had been dispensed at Buxton, and also a covered pot. He was thus able to trace the source of the modification at present official. Curd soap makes a jelly, but hard soap an inelegant mixture. He would like Mr. Thompson to tell him why some soaps were so much better for shaving than others. Those prepared with lanolin, he had noticed, lather much better than any other varieties.

The Chairman said that for a long time past he had made a lin. pot. iod. c. sapone exactly like that of the new Pharmacopœia. He had always mixed the glycerine and soap instead of the potassium iodide and glycerine, as directed by the late Pharmacopœia.

Mr. Hollis wished to know why ordinary green soap turned yellow.

Mr. Thompson, in reply, stated that boiling the soap with caustic lye had no effect in increasing its alkalinity, as the soap floated in a cake on the surface, and was afterwards thoroughly drained in specially constructed frames. Cochineal gives a purple tint in alkaline solutions, acids turn it bright yellow. The advantage is that the standard solution can be arranged to work to a definite yellow tint, and the estimation may be conducted by gaslight. The great disadvantage of cochineal lies in the fact that it is impossible to titrate back to the original colour. Hence two analyses are frequently necessary. Free acids are not liberated when soaps are decomposed by water, but an alkaline hydrate and acid oleate or stearate. Dr. Wright and he had based this conclusion on the behaviour of an ammoniacal soap. If an ammonia soap be exposed, the volatile alkali gradually disappears and an acid salt remains. The phenomenon of hydrolysis can be prettily shown by making an alcoholic solution of a neutral soap, and adding a little phenolphthalein. Pour into a long glass jar, and when set into a jelly, add some water. As the latter sinks in the soap solution, it leaves a crimson track due to the liberation of free alkali. He did not agree with Mr. Millard as to the desirability of having carbonated alkali in soaps. Neutral soap possesses the same cleansing properties as very alkaline samples, and leaves a much more pleasant sensation after use. It is certain some fatty acids are more detergent than others, and that is the reason neutral soaps differ in cleansing powers. Dr. Wright had patented a neutral soap which exercised really an extraordinary detergent effect. It would remove almost anything from the hands, and no unpleasant feeling remained. With regard to Mr. Burnett's query, it was not in his power to give any information respecting lin. terebinthinæ. In the preparation of lin. pot. iod. c. sapone, the way in which the glycerine was added undoubtedly made a considerable difference. Green soaps that became yellow were badly prepared. If properly made they should not change.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, February 17, Dr. Hugo Müller, F.R.S., President, in the chair, when Messrs. E. Hori and Charles E. Sohn, Jun., were formally admitted Fellows of the Society, and several certificates were read for the first time.

It was announced that the following changes in the Council List were proposed by the Council:—

As President: Mr. W. Crookes, F.R.S., *vice* Dr. Hugo Müller, F.R.S.

As Vice-Presidents: Professor McLeod, F.R.S., Professor Schlorlemmer, F.R.S., and Mr. Ludwig Mond, *vice* Mr. Crookes, F.R.S.. Professor Liveing, F.R.S., and Professor T. E. Thorpe, F.R.S.

As Ordinary Members of the Council: Professor A. H. Church, Dr. P. F. Frankland, Professor Kinch and Dr. H. F. Morley, *vice* Messrs. H. T. Brown, A. E. Fletcher, and Professors Mendola and Pickering.

The following papers were read:—

The Influence of Temperature on the Heat of Dissolution of Salts. By S. U. PICKERING.—This is an extension of the author's previous work on the sulphates—entitled "The Influence of Temperature on the Heat of Chemical Combination" (Trans., 1886, 260)—which tended to show that the heat of dissolution of a salt does not increase regularly with a rise of temperature, but that irregularities occur at various points, so that the heat of dissolution must be represented by a series of curves. The experiments with potassium sulphate, hydrated and anhydrous magnesium sulphate, and hydrated and anhydrous copper sulphate, have been repeated, and the investigation extended to potassium, sodium, hydrated and anhydrous strontium chloride, potassium and the two strontium nitrates, the two sodium carbonates, sodium acetate and potassium sodium tartrate. The investigation comprises over 700 determinations, the mean results with each salt being deduced from two to five distinct series of experiments, each performed with different thermometers. The observations extended from 3° to 25°. In all cases it was found that the irregularities previously noticed were the result of error, and that the heat of dissolution of a salt is represented by a series of straight lines. In rising from low temperature the heat of dissolution is expressed by a straight line up to a certain point, when the rate becomes suddenly lowered and remains constant till a further sudden reduction occurs at some still higher temperature. The average divergence of all the mean results from lines of perfect straightness amounted to less than one thousandth of a degree. With the normally anhydrous salts one lowering of the rate (amounting to about 30 per cent.) only was observed between 3° and 25°, occurring at temperatures between 14° and 9·5° in the various cases; while with the salts which combined with water ef crystallization the first alteration occurred at temperatures between 9° and 7°, and a second change took place at 21° to 18°; the frequency as well as the temperature of occurrence appearing to depend mainly on the tendency of the salt to combine with water. This lowering of the rate of increase in the heat of dissolution as the temperature rises must be accompanied by an increase in the specific heat of the solution which would indicate decomposition of some description. Marignac's determinations of the specific heat of solutions give a rate of increase agreeing very closely with the author's results, and they also show that a further lowering takes place at temperatures above 25° up to 50°. Tilden's direct determinations of this rate at the higher temperatures show a very much larger decrease in the rate, but they cannot be freely accepted, as they are entirely at variance, not only with all specific heat determinations, but also with a fundamental principle of thermochemistry. The heat of combination of a salt with its water of crystallization is deduced from the author's results. He concludes that it is not a constant quantity at all temperatures; the general effect of rise of temperature being to diminish it, although at very low temperatures this effect seems to be more than counterbalanced by some other cause, probably the tendency of the water molecules to unite with each other, the heat of combination diminishing then with fall of temperature. The more water a salt contains the more marked are both these results.

Periodates. By C. W. KIMMINS, D.Sc., B.A.—The author, at the suggestion of Mr. Pattison Muir, has re-examined certain periodates of potassium, silver and sodium, with the object of explaining the discordant results of various observers. Besides the salt $Na_2H_3IO_6$, described by Langlois, he has obtained a sodium periodate of the formula $Na_3H_2IO_6$; he also describes a potassium periodate $K_3HI_2O_9$. He has prepared and analysed the following silver salts:—

Ag_2HIO_5, dark brown.	$AgIO_4$, bright yellow.
$Ag_2H_3IO_6$, dark red.	$Ag_4I_2O_9 \cdot 3OH_2$, light yellow.
$Ag_3H_2IO_6$, slate-coloured	$Ag_4I_2O_9 \cdot OH_2$, claret-coloured.
$AgIO_4 \cdot OH_2$, orange.	$Ag_4I_2O_9$, chocolate-coloured.

Sulphonic Acids derived from the β-monohaloid-derivatives of Naphthalene. By H. E. ARMSTRONG and W. P. WYNNE.

The Decomposition of Potassium Chlorate and Perchlorate by Heat. By FRANK L. TEED, D.Sc.

The Formation of Ethylic Cyanacetoacetate. By Dr. J. JAMES.

The Relation of Diazobenzene Anilide to Amidoazobenzene. By R. J. FRISWELL and A. G. GREEN.

Note on Wallach's Explanation of the Isomeric Transformation of Diazoamidobenzene into Amidoazobenzene. By R. MELDOLA, F.R.S.

Provincial Transactions.

LEICESTER AND LEICESTERSHIRE CHEMISTS' ASSOCIATION.

The annual meeting of this Association was held at St. George's Chambers Leicester, on Thursday evening February 17.

The President, Mr. J. G. F. Richardson, F.C.S., J.P., occupied the chair, and there was a good attendance of members and associates.

The Treasurer read the financial report, which showed a balance in hand of £14 16*s.* 8*d.*, which, considering the heavy expenses incurred in fitting up the rooms, was highly satisfactory. The Secretary then read the annual report, which was as follows:—

ANNUAL REPORT.

Your Committee has pleasure in submitting the first annual report of this Association, and in doing so begs to call attention to the measure of success which has attended its efforts during the year.

Soon after the foundation of this Association, your Committee applied for and obtained a grant of £25 from the Pharmaceutical Society, which enabled it to fit up the room as a class room and chemical laboratory, and to purchase apparatus for carrying on the educational work of the Association. Your Committee begs to thank the Council of the Pharmaceutical Society for so promptly and generously responding to its application. The thanks of the Association are also due to Messrs. J. Richardson and Co. for a donation of £5 5*s.* A class for the study of systematic botany was conducted during the summer months of last year by Mr. S. F. Burford, at which the average attendance was fifteen. Specimens of flowers, etc., for this class were provided by Mr. J. Burns, of the Abbey Park, to whom the Committee begs to tender its thanks. The winter session was inaugurated by a dinner at the Bell Hotel. Forty-five attended, and a most enjoyable evening was spent. Classes for the study of chemistry, materia medica, and pharmacy have been held during the winter months; these have been a great success, the attendance on several occasions exceeding the accommodation. The lecturers report most favourably on the way the students have worked.

The thanks of the Association are due to Messrs. Brice, Burford, Garratt, Goodess and Rowe, for the time and attention they have given in conducting the various classs.

Your Committee is pleased to notice that several past and present students of the Association have been successful in passing the examinations of the Pharmaceucal Society.

Arrangements were made with Mr. Knowles, classical tutor, to conduct a class for the Preliminary examination at a nominal fee to associates. Thirteen pupils joined, but on account of the variable amount of knowledge possessed by the students it is proposed to divide the class into preparatory and advanced classes, and hold it on two nights weekly instead of one as heretofore.

Your Committee begs to tender its grateful thanks to Professors Attfield and Bentley, Messrs. Christy, Holmes, Ince, Lescher, Luff, Martindale, Squire and Wills, for gifts of new books for the library, and to Mr. Esam for the gift of a set of apparatus for volumetric

analysis. Messrs. Southall Bros. and Barclay were good enough to send a specimen of the gum benzoin which has been buried in the sand at Table Bay for nearly two centuries; this is a valuable addition to our museum, as is also the specimen of strophanthus pods sent by Messrs. Christy and Son, and thanks are accorded to the donors.

Several cases of infringement of the Pharmacy Act have been brought to the notice of the Secretary. In two cases the Council of the Pharmaceutical Society was communicated with, and steps were promptly and successfully taken; in other cases the offenders were warned of the consequences if they failed to respect the Act of Parliament.

The report, after an expression of thanks to the Council of the Pharmaceutical Society for the gift of mounted botanical specimens, and for the regular supply of the *Pharmaceutical Journal*, to the Editor of the *British and Colonial Druggist* for the supply of copies, and to the British Pharmaceutical Conference for the gift of the 'Year-Book of Pharmacy,' concluded by congratulating the Association on the state of its finances, and pointing out how much the success of the Association depends on the individual efforts of every member.

The President, in moving the adoption, urged the members not to rest satisfied with the result of their work, however good, but to use every honest endeavour to improve the educational status of the profession. The Council of the Pharmaceutical Society was always ready to help provincial associations where good work was being done, and the result justified it in doing so. He should, as long as he had a seat on the Council, do what he could to plead their cause and assist them in every way. The annual report was in marked contrast with the gloomy and pessimist reports which one reads in the *Pharmaceutical Journal*, but he himself thought that failure arose from apathy on the part of the rank and file. He denied the right of a few West-end chemists to speak for the trade at large, as they did not understand the wants and requirements of provincial pharmacists. He hoped the Pharmacy Act which the Council had in view would become law, so that they would be in a position to amend and modify their bye-laws, and provide for a suitable curriculum. He believed that if any young man learnt his profession well and carried it on in an honest business-like manner, he must succeed. He had no sympathy with members of the trade who sold garbled preparations for what the public confidently asked for as genuine preparations; it was neither safe for the public, nor creditable to the trade that such preparations as laudanum and sweet nitre should be a different preparation in different towns or in different shops in the same town. He urged the students to work hard and obtain all the knowledge they could at the classes, and to submit to the periodical examinations. It was very gratifying to know that out of the sixteen prizes given at St. Mary's and Westminster Hospitals, eleven were carried off by former students of this Association.

Mr. E. H. Butler seconded the motion, which was carried.

Mr. T. H. Lloyd proposed a vote of thanks to the teachers, this was seconded by Mr. Davis, and carried by acclamation.

Votes of thanks to the Committee and to the Hon. Secretary brought the meeting to a close.

At the ballot for the Council for the present year, the following were elected:—President, Mr. J. G. F. Richardson; Vice-Presidents, Messrs. J. H. Lloyd, and J. Young; Treasurer, Mr. W. Thirlby; Hon. Secretary, Mr. J. J. Edwards: Members of Council, Messrs. Burford, Butler, Dudley, Goodess and Rowe.

LIVERPOOL CHEMISTS' ASSOCIATION.

The eighth general meeting of the thirty-eighth session was held at the Royal Institution on Thursday evening, 17th inst. The President, Mr. A. C. Abraham, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations announced:—'The Calendar of the Pharmaceutical Society, 1887,' from the Society; *Pharmaceutical Journal*, from the Society; *Canadian Pharmaceutical Journal*, from the publisher; *British and Colonial Druggist*, from the publishers; 'Index to the Literature of Explosives.' Part I. By Professor Munroe, U.S. Naval Academy.

A vote of thanks was accorded to the respective donors, and the President showed a new form of specific gravity bottle with thermometer.

The President now said that the business of the evening was a "discusssion of the proposed Pharmacy Act Amendment Bill," and called upon Dr. Symes to open the discussion. This Dr. Symes did, and explained very lucidly the present position and the objects of the proposed Bill.

Messrs. A. C. Abraham, T. F. Abraham, E. Davies and J. S. Ward took part in the discussion.

The opinion of the meeting was very divided on the subject, and no resolution was proposed.

It was intended, also, to discuss "Sir John Lubbock's Shop Hours Bill;" but time would not allow, and it was postponed until the next meeting.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Albumen Test for Nitric Acid.

Sir,—In Mr. Proctor's valuable paper on "Pharmacopœial Testing," the following passage occurs, "Why not tell us what impurity would be detected by a solution of albumen? . . . . Though nitric acid is well known as a test for albumen, the converse application of this reaction is not so common as to make an explanation undesirable." I have always understood the albumen test was given for detecting the presence of metaphosphoric acid, which, if present, would coagulate the albumen; a result which would only occur with moderately strong nitric acid. Another test is given for detecting nitric acid, viz., strong sulphuric acid and ferrous sulphate. Mr. Proctor would have conferred a boon on many readers of the "Journal," if his paper had been accompanied by a sketch of his extemporized nitrometer.

14, *Market Place, Chesterfield.* J. R. D. Barfoot.

An Associate.—We fail to see what Mr. Proctor's paper has to do with the criticisms that called forth Dr. Attfield's reply.

V. S.—The exemption is specified in the first section of the Pharmacy Act Amendment Act of 1869, which provides that nothing contained in the first fifteen sections of the Pharmacy Act, 1868, shall prevent any person who is a member of the Royal College of Veterinary Surgeons of Great Britain, or holds a certificate from the Highlands and Agricultural Society of Scotland, from dispensing medicines for animals under his care.

E. Rees.—*Petasites fragrans.*

C. M.—The article is probably a quack medicine.

H. P. T. L.—The address of the Royal College of Veterinary Surgeons is Great College Street, Camden Town, N.W.

E. Brooke.—Your assertion is incorrect, the person mentioned having been a registered chemist and druggist, as may be seen by referring to the Register.

E. O.—(1) *Bryum capillare.* (2) *Racomitrium heterostichum.* (3) *Tortula unguiculata.* (4) *Hypnum cupressiforme.* (5) *Racomitrium fasciculare.* (6) *Schistidium maritimum.*

Communications, Letters, etc., have been received from Messrs. Mitchell, Blake, Hunter, Humphrey, Dispenser, Paranitrosophenol.

BENEVOLENT FUND.

STATEMENT OF RELIEF GRANTED DURING 1886.

ANNUITANTS.

				£	s.	d.	£	s.	d.
37	Annuitants	@ £35 per annum	... ...	1295	0	0			
7	do.	@ £30	„	210	0	0			
1	do. one quarter	@ £30	„	7	10	0			
	do. three quarters	@ £35	„	26	5	0			
1	do. two quarters	@ £30	„	15	0	0			
	do. two quarters	@ £35	„	17	10	0			
1	do. (deceased) three quarters	@ £35	„	26	5	0			
							1597	**10**	**0**

Total number of Annuitants during 1886 ... **47**

TEMPORARY GRANTS.

Amount granted in **65** cases after investigation by the Committee... ... **631 14 5**

Total amount of Relief granted during 1886 ... **£2229 4 5**

SPECIAL NOTE.—The benefits of the Benevolent Fund were, by the provisions of the Pharmacy Act, 1868, extended to all persons—whether connected with the Pharmaceutical Society or not—whose names appear on the Register of Chemists and Druggists, and the widows and orphans of such persons.

BENEVOLENT FUND.

LOCAL LIST OF SUBSCRIPTIONS & DONATIONS

RECEIVED DURING 1886.

	£	s.	d.
Aberayron.			
Jones, John Price	0	2	6
Aberdare.			
Jones, D. W.	0	5	0
Smith, Morgan	0	2	6
Aberdeen.			
Broomhead, George E.	0	5	0
Coutts, Charles	0	5	0
Cruickshank, Geo. P.	0	5	0
Davidson, Charles	1	1	0
Giles, William	0	5	0
Glover, W. K.	0	5	0
Gordon, William	0	5	0
Johnston, John	0	5	0
Kay, James P.	0	10	6
Kemp, James	0	5	0
Mackay, Wm.	0	5	0
Paterson and Sons	0	10	6
Sim, James	0	5	0
Sinclair, William	0	10	6
Strachan, Alexander	0	5	0
Aberfeldy.			
Macnaughton, H. B.	1	1	0
Abergavenny.			
Shackleton, G. W.	0	5	0
Abergele.			
Hannah, John	0	2	6
Aberystwith.			
Davies, David J.	0	2	6
Ellis, Robert	0	2	6
Thomas, John	0	2	6
Wynne, Edward P.	0	10	6
Abingdon.			
Allen, Herbert	0	2	6
Osborne, Geo. C.	0	5	0
Smith, William	0	5	0
Smith, William F.	0	5	0
Aboyne.			
Petrie, James J.	0	5	0
Accrington.			
Stanley, Thomas	0	2	6
Addiscombe.			
Townsend, Charles	0	10	6
Alcester.			
Adcock, H. D.	0	5	0
Adcock, Isaac Dickson	0	10	6
Heath, Josiah W.	1	1	0
Overbury, Henry	0	5	0
Alcival North (Cape Colony).			
Broadhead, Richard	0	5	0
Aldershot.			
Williams, James	0	10	6
Alexandria (N.B.)			
McFarlane, Peter	0	5	0
Alford.			
Allis, Wm.	0	10	0
Alfreton.			
Robinson, Joseph S.	0	10	6
Alnwick.			
Newbigin, James L.	0	10	6
Newbigin, Lesslie	0	5	0
Alresford.			
Richardson, J. H.	0	2	6
Willis, William	0	2	6
Altrincham.			
Clarke, J. T.	0	5	0
Ambleside.			
Herd, Henry W.	0	2	6
Ampthill.			
Allen, George	1	1	0
Brown, James	0	10	6
Andover.			
Bienvenu, John	1	1	0
Angmering.			
Freeland, H. W.	0	2	6
Appleby.			
McConal, A.	0	5	0
Arbroath.			
Burn, David H.	0	5	0
Mill, William A.	0	5	0
Robertson, John	0	5	0
Whyte, James S.	0	5	0
Ashbourne.			
Bradley, Edwin Sylvester	0	10	6
Greaves, Frederick W.	0	5	0
Osborne, James	0	5	0
Reckless, A. H.	0	10	6
Ashby-de-la-Zouch.			
Bullen, George W.	1	1	0
Ashford (Kent).			
Brothers, John	1	1	0
Ingall, Joseph	1	1	0
Stedman, William	0	5	0
White, Charles Thomas	0	5	0
Ashford (Middlesex).			
Hazledine, Thomas	0	5	0
Ashton-under-Lyne.			
Arnfield, John C.	0	5	0
Belfield, William	0	5	0
Bostock, William	0	5	0
Fisher, Edwin	0	5	0
Waterhouse, Jabez	0	10	6
Ashwell.			
Skelton, J. H.	0	5	0
Atherstone.			
Orme, William	0	10	6
Atherton.			
Fletcher, Ellis	0	5	0
Heywood, John H.	0	5	0
Aylesbury.			
Dickins, Rowland	0	5	0
Palmer, Edwin T.	0	5	0
Turner, John	0	5	0
Bakewell.			
Carrington, Edward G.	0	5	0
Thompson, John	0	5	0
Baldock.			
Bally, Edward F.	0	5	0
Kent, T. W. (Arlesey)	0	5	0
Banbury.			
Ball, George V.	1	1	0
Bartlett, H.	0	5	0
Gilkes, Frederick G.	0	5	0
Watts, W.	0	5	0
Banchory.			
Lunan, Alexander	0	5	0
Banff.			
Ellis, George	0	10	6
Bangor.			
Jones, Owen	0	5	0
Roberts, Meshach	1	1	0
Webster, Thomas	0	5	0
Barnstaple.			
Britten, Wm. B.	0	5	0
Goss, Samuel	0	5	0
Partridge, James	0	5	0
Pratt, Edward	0	5	0
Symons, William	0	5	0
Barrow-in-Furness.			
Sansom, E.	0	2	6
Barton-on-Humber.			
Ingoldby, William	0	2	6
Smith, Richard F.	0	5	0
Bath.			
Alcock, Henry	0	5	0
Appleby, E. J.	0	10	6
Bright, William	0	5	0
Capper, Edmund	0	5	0
Chadwick, G. W.	0	5	0
Clarke, B. G.	0	2	6
Collis, Samuel	0	5	0
Commans, Robert D.	1	1	0
Dunn, Richard	0	10	6
Goodman, D. H.	0	5	0
Griffin, Alfred W.	0	5	0
Hillier, Henry	0	10	6
Marsh, John H.	0	10	6
Masters, Henry James	0	5	0
Merrikin, John B.	0	10	6
Oldham, R. T.	0	5	0
Partington, J. J.	0	5	0
Pinch, James E.	0	5	6
Sloan, William G.	0	7	6
Thomas, Henry J.	0	10	6
Thring, E. J. H. (Monkton Combe)	0	10	6
Tilsley, George	0	10	6
Toone, Joseph V.	0	10	6
Whiston, E.	0	5	0
Williams, Mrs. Sophia	0	10	6
Wilson, Joseph	0	5	0
Beaufort West (Cape Colony).			
Rivett, Arthur J.	0	10	6
Beaumaris.			
Slater, John	0	10	6
Bedale.			
Pratt, William (West Burton)	0	5	0
Swinbank, J.	0	5	0
Bedford.			
Anthony and Biss	0	10	0
Cameron, William Alexander	0	5	0
Clifford, R. N.	0	5	0
Corrie, A. A.	0	2	6
Corrie, Isabella A.	0	5	0
Ekins, John	0	10	6
Hester, Charles	0	5	0

Bedford—continued.	£	s.	d.
Mountford, Maurice	0	2	6
Norman, Joseph S.	0	5	0
Taylor, J. B.	0	5	0
Thompson, H.	0	5	0
Bedlington.			
Foggan, George	0	2	6
Belfast.			
Green, Thomas	0	5	0
Kennedy, William	0	5	0
Yoxall, Henry	0	5	0
Belper.			
Burkinshaw, W. T.	0	5	0
Calvert, James	0	5	0
Berkeley.			
Bell, Edward Collinson	0	10	6
Gowen, Albert	0	10	6
Berkhamsted.			
Bosher, Alexander	0	2	6
Berwick.			
Carr, Walter P.	0	2	6
Lyle, William	0	2	6
MacIntyre, John	0	5	0
Beverley.			
Marshall, Joseph J.	0	5	0
Marshall, Thomas	0	5	0
Bexhill.			
Brisley, George	0	5	0
Bexley Heath.			
Mason, Alfred J.	0	5	0
Pavey, H. J	0	5	0
Bicester.			
Bates, John	0	5	0
Sandiland, R. B.	0	10	6
Bideford.			
Betty, Samuel C.	0	10	6
Griffits, John A.	0	5	0
Hogg, Thomas	0	5	0
Biggar.			
Eunson, John	0	2	6
Biggleswade.			
Spong, D. M.	0	5	0
Bilston.			
Gray, Charles	0	5	0
Kearnes, Robert H.	0	5	0
Bingham.			
Doubleday, Frederick	0	5	0
Bingley.			
Skirrow. William E.	0	10	6
Slicer, Walter	0	7	6
Birkenhead.			
Barber, George	0	10	6
Dutton, H. O.	1	1	0
Field, H. E.	0	5	0
Foulkes, William James	1	1	0
James, Thomas C.	0	5	0
Mullock, Richard	0	10	6
Stewart, Alexander	0	10	6
Stewart, John	0	10	6
Wolliscroft, Henry	0	5	0
Birmingham.			
Barker, Thomas	0	10	6
Bird, Alfred	1	1	0
Brevitt, W. Y.	0	10	6
Brown, James	0	2	6
Campbell, Henry	0	2	6
Chase, Thomas, jun.	1	1	0
Churchill, Walter J.	0	10	6
Clayton, Francis Corder	1	1	0
Cornforth. Edwin	0	2	6
Foster, Alfred H.	0	5	0
Foster, James Alfred	0	2	6
Frobisher, Frederick	0	5	0
Greatrex, Henry	0	10	6
Holdsworth, Thomas W.	0	10	6
Hutton, Harry	0	2	6
Jacombs, W. H.	0	5	0
Jones, G. M.	0	5	0
Lucas, Joseph	0	10	6
Mantell, Charles	0	10	6
Mantell, Charles, jun.	0	10	6
Mott, John C.	0	5	0
Naish, C. E.	0	10	6

Birmingham—continued.	£	s.	d.
Pegg, Herbert	1	1	0
Perry, George E.	0	5	0
Perry, William Henry	0	5	0
Prosser, Frank H.	0	10	6
Snape and Son	0	10	6
Southall Bros. and Barclay	1	1	0
Thompson, William	0	5	0
Wakefield, John	1	1	0
Weaver, T.	0	5	0
Wilcox, George	0	10	6
Bishop Auckland.			
Dobinson, Thomas	0	5	0
Harburn, Alfred	0	5	0
Townend, Thomas F.	0	5	0
Bishop Stortford.			
Hardy, John	0	5	0
Speechly, George	0	10	6
Bishop's Castle.			
Bills, Martha Cam	0	10	6
Blackburn.			
Booth, James	0	10	6
Butterfield, William	0	5	0
Critchley, T.	0	5	0
Farnworth, William	1	1	0
Garland, A. P.	0	5	0
Hindle, James	0	2	6
Paffard, Frank	0	10	6
Blackpool.			
Jackson, Joseph	0	5	0
Parkinson, Charles	0	10	6
Richardson, W. C.	0	5	0
Blagdon.			
Dudden, R. M.	0	5	0
Blandford.			
Groves, Richard H.	1	1	0
Groves, Mrs. W. E.	1	1	0
Bodmin.			
Williams, Joel D.	1	1	0
Bognor.			
Long, Alfred T.	0	10	6
Bolton.			
Blain, Alfred Lucas	0	5	0
Blain, William	0	10	6
Blain, W. R.	0	5	0
Fawthorp, Joah	0	5	0
Forbes, James W.	0	10	6
Hart, James	1	1	0
Mather, James	0	10	6
Phillips, Sidney (Horwich)	0	5	0
Bombay (India).			
Davies, Richard	0	5	0
Prebble, John G.	0	5	0
Bonnyrigg.			
Hutcheon, W.	0	5	0
Boston (Lincs).			
Allen, Thompson	0	5	0
Bell, E. W.	0	2	6
Grimble, Albert	0	5	0
Haller, F. W.	0	5	0
Kent, B. J.	0	5	0
Pilley and Son	0	5	0
Boulogne-sur-Mer.			
Parsons, J. Vincett	0	5	0
Bourne (Lincs).			
Mills, Robert M.	0	10	6
Bournemouth.			
Beale, J. H. T.	0	5	0
Bilson, F. E.	0	5	0
Bridge, G. E.	1	1	0
Dobell, Dr. Horace	1	1	0
Duncan, Alexander	1	1	0
Endle, Frederick	0	10	6
Gilbert, William	0	5	0
Hardwick, Stewart	0	10	6
Hazard, James D.	0	5	0
Noble, James	0	5	0
Shipman, John J.	0	5	0
Spinney, Frank	0	10	6
Taylor, George	0	5	0
Toone, J. A.	0	10	6
Williams, W. L.	0	2	6
Worth, Edwin	1	1	0
Bowness-on-Windermere.			
Birkett, Charles	0	6	0

Bradford (Lancs).	£	s.	d.
Lambert, Thomas	0	5	0
Bradford (Yorks).			
Beanland, Samuel	0	5	0
Bell, Francis	0	10	6
Blackburn, Bailey	2	2	0
Butterworth, Albert	0	10	6
Cocker, Justus J.	0	5	0
Harrison, Parkinson and Co.	2	2	0
Houfe, R. W.	0	5	0
Lister, Simeon (Great Horton)	0	10	6
Rimmington and Son	1	1	0
Rogerson and Son	1	1	0
Stephenson, Robert	0	5	0
Watts, John	0	10	6
Wilson, Albert	0	5	0
Bradford-on-Avon.			
Cooper, Albert H.	0	10	6
Braintree.			
Baker, Sydney G.	0	2	6
Row, George C.	0	5	0
Brampton.			
Younger and Ridley	0	5	0
Branscombe.			
Cooper, George	0	10	6
Braughing.			
Franklyn, Thomas	0	5	0
Brecon.			
Meredith, John	0	10	0
Morris, J. C. B.	0	5	0
Bridgend.			
Jenkins, D.	0	5	0
Jones, M. H. (Garw Valley)	0	2	6
Lloyd, John	0	5	0
Williams, M. (Pencoed)	0	5	0
Bridgnorth.			
Cooper, H. S.	0	2	6
Hughes, Hubert	0	5	0
Steward, William	0	10	6
Bridgwater.			
Basker, J. A	0	5	0
Llewellyn, Lewis H.	0	2	6
Smith, Sidney	0	2	6
Woodward, John L. L.	0	5	0
Bridlington.			
Gatenby, Robert	0	5	0
Woodliffe, Alfred	0	2	6
Wrack, F. G.	0	2	6
Bridlington Quay.			
Dickins, Mary	0	5	0
Jackson, Henry J.	0	5	0
Bridport.			
Beach and Barnicott	1	1	0
Beach, James	0	10	0
Beach, Thomas E.	0	2	6
Jones, Frederick	0	2	6
Brightlingsea.			
Cooper, George B.	0	5	0
Brighton.			
Arnold, J.	0	2	6
Barton, Charles	0	10	6
Barton, Henry	0	10	6
Bullen, Thomas	0	10	6
Cant, Evans	0	5	0
Chambers, Herbert	0	2	6
Chapman, F.	0	10	6
Colby, Mrs. G.	0	10	6
Cook, H. F.	0	2	6
Cox, Arthur H.	1	1	0
Crassweller, W. E.	0	2	6
Damant, Arthur A.	0	2	6
Douglas, W.	0	2	6
Edwards, J.	0	5	0
Ellis, C. J.	0	2	6
Else, William	0	10	6
Everard, A. G.	0	2	6
Gibson, W. H.	0	5	0
Glaisyer, Thomas	0	10	6
Grinsted, J.	0	2	6
Guy, Frederick	0	10	6
Gwatkin, James Ross	0	10	6
Hardcastle, S. B.	0	10	6
Harris, E. R.	0	5	0
Hickley, G.	0	10	6
Hornsby, George G.	0	10	6
Jeeves, Thomas	0	10	6

Brighton—continued.	£	s.	d.
Kemp, John	0	10	6
Leigh, Marshall	1	1	0
Levett, H.	0	5	0
Llewellyn, Peter H.	0	5	0
Metherell, K.	1	1	0
Muston, G. G.	0	5	0
Padwick, John	0	10	6
Parris, T. W.	0	5	0
Perress, J. C.	0	5	0
Roberts, A. T.	0	5	0
Robson, Thomas	0	10	6
Salmon, E. F.	0	5	0
Salmon, F. W.	0	10	6
Savage and Son	1	1	0
Smith, Walter Henry	1	1	0
Smithson, J.	0	10	6
Stableforth, J. W.	0	5	0
Vizer, Edwin B.	0	10	6
Ward, Charles T. (Southwick)	0	2	6
Williamson, J.	0	5	0

Brill (Bucks).			
Tottenham and Holmes	0	10	6

Bristol.			
Ackerman, Theophilus	1	1	0
Allen, Benjamin	0	10	6
Bamfield, John	0	5	0
Barton, J. B. (Kingswood)	0	5	0
Bennett, Joseph	0	5	0
Berry, William	0	10	6
Boucher, John	1	1	0
Bramald, F. D.	0	5	0
Butler, Samuel	1	1	0
Callaway, Lemuel	0	10	6
Cox, Arthur	0	2	6
Cuff, Robert C.	0	5	0
Dibble, J. W.	0	10	6
Freestone, R. H.	0	5	0
Freestone, Thomas M.	0	10	6
Hodder, Henry	0	5	0
Howell, Henry	0	5	0
Isaac, G. W.	0	10	6
Jeffery, Henry	0	10	6
Jennings, Thomas H.	0	5	0
Jones, William W.	1	1	0
Keen, Benjamin	0	10	6
Latrobe, Henry	0	5	0
Llewellyn, David	0	2	6
Long, John T.	0	10	6
Munk, F. A.	0	5	0
Newman, Robert	0	10	6
Pitchford, William	0	10	6
Pitman, John	1	1	0
Plumley, James G.	0	5	0
Presley, Edward	0	5	0
Schacht, G. F.	1	1	0
Spill, Thomas	0	10	6
Stroud, John	1	1	0
Thomas, J., D.D. (donation)			0
Towerzey, Alexander	0	10	6
Townsend, Charles	1	1	0
Townsend, Henry H.	0	10	6
Troake, R. J.	0	10	6
Turner, George T.	0	10	6
Wade, Thomas T.	0	2	6
Walton, Frederick M.	0	5	0
Warren, Algernon	1	1	0
Watson, E. M.	1	1	0
White, James W.	0	10	6
Wretts, John R.	0	10	6

Briton Ferry.			
Olive, W. T.	0	5	0

Bromley (Kent).			
Goulden, Herbert	0	5	0
Shillcock, George	0	5	0
Skinner, Richard	0	10	6

Bromyard.			
Jones, Charles	0	5	0

Broughty Ferry.			
Fleming, E.	0	5	0

Brynmawr.			
Evans, Alfred E.	0	5	0
Jones, Alfred M.	0	10	6

Buckingham.			
Kingerlee, George	1	1	0

Bungay.			
Owles, C. E.	0	2	6

Burnham (Bucks).			
Heald, Alfred J.	0	10	6

Burnham (Essex).	£	s.	d.
Ellis, William	0	5	0

Burnham Market.			
Spencer, William Henry	0	5	0

Burnley.			
Barlow, Joseph A.	0	2	6
Cowgill, Brian H.	0	10	6
Evans, Thomas	0	5	0
Francis, Charles E.	0	5	0
Heaton, Martha	0	2	6
Hitchin, Robert	0	5	0
Holden, John	0	5	0
Munn, Robert	0	5	0
Parkinson, I.	0	5	0
Parkinson, William	0	5	0
Smith, John Jeremiah	0	2	6
Walker, Sandford	0	5	0
Wilks, Maurice	0	2	6
Wright, John W.	0	2	6

Burntisland.			
Gilmour, Andrew	0	5	0

Burslem.			
Blackshaw, Thomas	0	10	6
Leicester, Thomas	0	10	6
Oldham, William	0	10	6
Wardle, Thomas	0	2	6

Burton-on-Trent.			
Ottey, Thomas	0	5	0
Wright, George	0	10	6

Bury.			
Bowker, Ellis	0	10	6
Crompton, Alfred	0	5	0
Mather, J. H.	0	5	0

Bury St. Edmunds.			
Allan, Henry	0	5	0
Brain, F. S.	0	5	0
Clark, Owen A.	0	2	6
Crassweller, W. E.	0	5	0
Kirkham, Thomas	0	2	6
Last, A. J.	0	2	6
Portway, John	0	2	6
Summers, Frank	0	5	0
Summers, Thos. D.	0	5	0
Youngman, Edward	0	2	6

Buxton (Derbyshire).			
Thresh, Arthur	0	5	0
Thresh, Dr. John C.	1	1	0
Wright, Robert	0	10	0

Cambridge.			
Beall, George	0	5	0
Beall, Samuel S.	0	5	0
Church, H. J.	1	1	0
Deck, Arthur	0	10	6
Field, Ebenezer	0	5	0
Gillett, C.	0	5	0
Greenwood, Dennis	0	5	0
Hoare, W. P.	0	5	0
Ivatt, Albert	0	5	0
Pain, Walter E.	0	5	0
Sturton, Richard	1	1	0
Throssel, John	0	5	0
Yeomans, John	0	5	0

Canterbury.			
Amos, Daniel	0	10	6
Biggleston, E. R.	0	5	0
Bing, Charles	0	5	0
Bing, Edwin	0	10	6
Harris, F. R.	0	10	6
Pittock, Dr. F. W.	0	5	0
Thomas, James (Bridge)	0	5	0

Canton (China).			
Brunt, G. H.	0	10	6

Cape Town.			
Tebb, Henry	1	1	0

Cardiff.			
Anthony, David	0	10	6
Coleman, Alfred	0	10	6
Coleman, E. J.	0	10	6
Collier, J. A.	0	5	0
Davies, G.	0	2	6
Drane, Robert	0	10	6
Duck, Richard W.	0	5	0
Furnival, William	0	5	0
Greaves, John	0	5	0
Hagon, Albert	0	5	0
Harris, D.	0	5	0
Hicks, W. T.	0	5	0
Howell, Thomas	0	5	0

Cardiff—continued.	£	s.	d.
Jones, J. A.	0	2	6
Jones, John T.	0	5	0
Joy, F. J. J.	0	5	0
Lloyd, David	0	5	0
Mumford, Richard	0	5	0
Munday, John	0	10	6
Phillips, John	0	2	6
Prust, Richard	0	2	6
Rees, John	0	5	0
Robb, John	0	5	0
Sanders, W. J.	0	5	0
Simpkins, George	0	5	0
Whineray, Edward	0	5	0
Williams, E. W.	0	2	6
Williams, Jesse	0	5	0
Williams, R. E.	0	2	6
Williams, Thomas	0	10	6
Williamson, J. E.	0	5	0
Yorath, T. B.	0	5	0

Carlisle.			
Bell, John	0	5	0
Fisher, Catherine Hodgson	0	5	0
Foster, James	0	5	0
Hallaway, John	0	5	0
Martlew, Thomas	0	5	0
Parker, Edward J.	0	5	0
Parker, William	0	5	0
Robson, John	0	5	0
Thompson, Andrew	0	10	6
Todd, Joe	0	5	0

Carluke.			
Hinksman, John	0	5	0

Carmarthen.			
Davies, Richard Morgan	0	5	0
Lloyd, Walter	0	5	0
Smith, John H.	0	5	0

Carnarvon.			
Francis, James	0	2	6
Jones, David	0	5	0
Jones, John	0	5	0
Lloyd, William	0	5	0
Owen, G. C. R	0	2	6

Carshalton.			
Carter, Francis	0	10	6

Castle Cary.			
Moore, Francis S.	0	5	0

Castle Douglas.			
Veitch, A.	0	5	0

Chapel Allerton.			
Saville, William	0	5	0

Chard.			
Churchouse, W. B.	0	5	0

Charlestown-of-Aberlour.			
Smith, John	0	2	6

Chatham.			
Crofts, Holmes C.	0	10	6
French, Miss	0	10	6
Lamb, Thomas C.	0	5	0
Modlen, Robert	0	5	0
Morgan, Alfred W.	0	5	0
Thompson, George Alfred	0	5	0

Cheddar.			
Allen, Samuel	0	5	0

Chelmsford.			
Baker and Wright	0	10	6
Metcalfe, Wilson	0	10	6
Tomlinson, James	0	10	6

Cheltenham.			
Balcomb, John	1	1	0
Barron, William	0	10	6
Beetham and Son	1	1	0
Board, Thomas F.	0	2	6
Butcher, Thomas	1	1	0
Cooper, A.	0	2	6
Dolman, William	0	5	0
Edwards, W. P.	0	2	6
Fletcher and Palmer	1	1	0
Fletcher, John	1	1	0
Hands, William	0	5	0
Hill, Arthur	0	5	0
James, Joseph	0	2	6
Jeffrey, Thomas A.	0	10	6
Kite, W. T.	0	10	6
Lucas, E. W.	0	5	0
Macdonald, E.	0	2	6
Mansbridge, M. C.	1	1	0

Cheltenham—continued.	£	s.	d.
Pattison, Thomas	0	10	6
Power, J. H.	0	5	0
Prockter and Forth	1	1	0
Purnell, Henry A.	0	5	0
Sanderson, W.	0	2	6
Smith, Nathaniel and Co.	1	1	0
Smith, William H.	0	5	0
Stewart, James	0	10	6
Sumner, W.	0	5	0
Thomas, Brothers	0	10	6
Walters, John	0	10	6
Watson, R. T.	0	5	0
Wood, Frederick	0	10	6
Woodward, Solomon	0	10	6
Chepstow			
Tame, Thomas	0	5	0
Chertsey.			
Boyce, George	0	5	0
Flintan, F. R.	0	5	0
Chester.			
Baker, —	0	5	0
Baxter, George	0	10	6
Bowers, James D.	0	5	0
Caldecott, Clement G.	0	5	0
Grindley and Son	0	10	6
Guy, John (Broughton)	0	5	0
Hodges, William	0	10	6
Huke, James W.	0	5	0
Mills, John	0	5	0
Roberts, R. M.	0	5	0
Shrubsole, G. W.	0	5	0
Spencer, J. H.	0	5	0
Chesterfield.			
Barfoot, J. R. D.	0	2	6
Booth, George	0	10	6
Elliott, Thomas	0	5	0
Furness, Thomas	0	2	6
Greaves, A. W.	0	5	0
Lancaster, Wm. G.	0	5	0
Lowe, A.	0	5	0
Sampson, George	0	2	6
Windle, John T.	0	5	0
Wright, G.	0	2	6
Wyatt, Wm.	0	5	0
Chester-le-Street.			
Greenwell, Richard Henry	0	10	6
Chew-Magna.			
Milton, Thomas	0	5	0
Chichester.			
Baker and Son	0	10	6
Batchelor, C. J. H.	0	5	0
Ellidge, John W.	0	10	6
Chippenham.			
Coles, John C.	0	10	6
Turpin, A. B.	0	5	0
Chipping Ongar.			
Ward, David	0	10	6
Chipping Sodbury.			
Jones, Richard	0	10	6
Chislehurst.			
Wing, Lewis	1	1	0
Chorley.			
Hill, William	0	5	0
Christchurch.			
Green, John	0	5	0
Chulmleigh.			
Joint, Robert James	0	6	0
Cirencester.			
Griffiths, Waldron	0	10	6
Kinch, Edward	0	10	6
Paternoster, J.	0	5	0
Clacton-on-Sea.			
Mann, William	0	2	6
Claycross.			
Lloyd, Robert	0	10	6
Smith, John	0	5	0
Clun.			
Darroll, William	1	1	0
Coatbridge.			
Mowat, J. W.	0	5	0
Cobham.			
Redfern, John	1	1	0

Cockermouth.	£	s.	d.
Bowerbank, Joseph	1	1	0
Brown, R. F.	0	2	6
Cooper Brothers	0	2	6
Robinson, William	0	5	0
Straughton, Joseph	0	2	6
Codnor (near Derby).			
Farnsworth, Thomas	0	5	0
Colchester.			
Barritt and Son	0	10	6
Bates, Thomas W.	0	5	0
Cole, Fred A.	0	5	0
Cordley, W. B.	0	5	0
Davies, Rees	0	5	0
Hammerton, Edward	0	5	0
Hopkins, W. R.	0	2	6
Prosser, Mrs.	0	5	0
Shenstone, J. C.	0	5	0
Simpson, Hales	0	5	0
Weddell, Arthur	0	5	0
Congleton.			
Cole, Frederick	0	5	0
Connah's Quay.			
Jones, Kendrick L.	0	2	6
Cork.			
Selkirk, James	0	10	6
Corris.			
Thomas, Maurice	0	5	0
Corwen.			
Jones, William	0	10	6
Coventry.			
Axford, J. W.	0	5	0
Bird, Frederick	0	5	0
Brown, John	0	2	6
Clarke, William	0	2	6
Glover, Henry	0	2	6
Hinds, James	0	10	6
Jelly, George William	0	2	6
Loveitt, Mrs.	0	2	6
Makepeace, A. J.	0	2	6
Mason, D.	0	2	6
Newton, Alfred H.	0	2	6
Sellors, Thomas	0	2	6
Thompson, A. L.	0	2	6
Wyleys and Co.	2	2	0
Cowbridge.			
Thomas, John	0	5	0
Cowes (Isle of Wight).			
Beaven, George A.	0	10	0
Fennings, Alfred	1	1	0
ditto (donation)	5	5	0
Cranbrook.			
Turner, John	0	5	0
Crawley.			
Leach, John	0	5	0
Webb, W. J.	0	5	0
Weedon, Joseph	0	5	0
Crediton.			
Jackson, William	1	1	0
Jackson, W. H.	0	5	0
Crewe.			
Bayley, William	0	10	6
Harrop, Wm. H.	0	5	0
Crewkerne.			
Catford, O. W.	0	5	0
Criccieth.			
Bowen, Joseph W.	0	2	6
Cromer.			
Priest, Edward R.	0	10	6
Croydon.			
Clarke, Josiah	1	1	0
Clarke, Walter	0	5	0
Culverwell, John S.	0	5	0
Dixon, W. R.	0	5	0
Harwood, Charles	0	5	0
Long, Henry	0	10	6
Padwick, W. G.	0	5	0
Roberts, D. P.	0	10	6
Sergent, William	0	5	0
Williams, James	0	10	6
Cullen (N.B.)			
Buchanan, John	0	2	6
Seivwright, George	0	10	6

Dalton-in-Furness.	£	s.	d.
Preston, William L.	0	5	0
Darlington.			
Best, George	0	2	6
Best, J. W.	0	5	0
Cranston, John	0	5	0
Nicholson, Richard	0	5	0
Raw, James H.	0	5	0
Robinson, James	0	5	0
Swenden, James	0	10	6
Walton, Frederick G.	0	2	6
Dartford.			
Wilson, R. E.	0	5	0
Dartmouth.			
Humphrey, Horatio	0	5	0
Rees, Colin A.	0	5	0
Rees, William H.	0	10	6
Deal.			
Dunn, George S.	0	5	0
Green, John	0	10	6
Denton (Lancs).			
Arrandale, William	0	10	6
Derby.			
Bishop, E. J.	0	5	0
Clifton, Frederick	0	10	6
Cope, J. A.	1	1	0
Frost, George	0	10	6
Hefford, Charles	0	5	0
Hughes, John S.	0	2	6
Monkhouse, Henry	0	5	0
Nicklinson, Thomas	0	5	0
Sherwin, T.	0	2	6
Stevenson, Richard W.	0	5	0
Wilson, Joseph	0	5	0
Devizes.			
Clark, Robert	0	10	6
Edwards, T. R.	0	2	6
Devonport.			
Codd, Francis	0	5	0
Lamble, John A.	0	2	6
Didsbury.			
Bates, John F.	0	5	0
Richardson, Allen	0	5	0
Diss.			
Cupiss, Francis	0	10	6
Gostling, T. P.	0	10	6
ditto (donation)	3	3	0
Thrower, Edward A.	0	10	6
Whitrod, H. F.	0	5	0
Doncaster.			
Atkinson, Stephen (Arksey)	0	10	6
Connor, Thomas H.	0	5	0
Dunhill and Stiles	1	1	0
Hasselby, Thomas J.	0	5	0
Hough, William	0	5	0
Howorth, James	0	10	6
Parkin, Charles	0	5	0
Pickering, John (Crowle)	0	5	0
Dorchester.			
Durden, H.	0	5	0
Evans, Alfred J.	0	5	0
How, William	0	5	0
Pearce, William L.	0	7	6
Watts, E. P.	0	5	0
Dorking.			
Clark, W. W.	0	10	6
Clift, Joseph	0	10	6
Doubleday, F. W.	0	10	6
Douglas (Isle of Man).			
Brearey, A. W.	0	10	6
Brearey, Wm. A.	1	1	0
Gore, J. R. A.	0	5	0
Greensill, T. S.	1	1	0
Dover.			
Adams, R. W.	0	5	0
Barnes, William James	0	5	0
Bolton, J.	0	5	0
Bottle, Alexander	1	1	0
Brown, Joseph Fred.	1	1	0
Clarke, Herbert	0	5	0
Cotterell, W. B.	0	2	6
Dickeson, Sir Richard	1	1	0
Ewell, Richard M.	0	5	0
Forster, Robert Henry	0	10	6
Hambrook, John Barber	0	5	0
Leigh, H. M.	0	2	6

Dover—continued.	£	s.	d.
Peake, Henry	1	1	0
Thompson, Edward	0	10	6
Wyles, William	1	1	0
Downham.			
Porter, Samuel E.	0	2	6
Driffield.			
Bordass, James	0	5	0
Parkinson, Thomas	0	5	0
Dublin.			
Bowles, Charles A.	0	10	6
Dudley.			
Green, William	0	2	6
Thompson, John W. (Sedgeley)	0	10	6
Dufftown (N.B.).			
Sangster, William	0	5	0
Dumbarton.			
Babtie, John	0	5	0
Campbell, Colin	0	5	0
Dumfries.			
Allan, William	0	5	0
Dundee.			
Hardie, James	0	10	6
Hardie, James M.	0	10	6
McMillan, James	0	10	6
Dunfermline.			
Gilmour, David	0	2	6
Seath, Alexander	0	10	6
Dunkeld.			
McDonald, Kenneth	0	10	6
Dunse.			
Veitch, James	0	10	6
Dunstable.			
Flemons, Joseph	0	5	0
Durham.			
Bowman, S.	0	2	6
Burdon, John	1	1	0
Cormack, George	0	5	0
Leighton, Mrs.	0	10	6
Longbotham, Joseph (Sacriston)	0	5	0
Palmer, John G.	0	2	6
Rollin, John G.	0	10	6
Sarsfield, John	0	2	6
Sarsfield, William	0	10	6
Scawin and Burn	0	10	6
Wise, Joseph N.	0	5	0
Ealing.			
Curtis, Fred. G.	0	10	6
Hayles Brothers	1	1	0
Hucklebridge, J. M.	0	5	0
Jacks, D. R.	0	5	0
Luff, A. P.	0	10	6
Earlstown.			
Hogg, Andrew	0	2	6
Peake, Arthur	0	5	0
Eastbourne.			
Andrews, H. T.	0	10	6
Andrews, J. F.	0	10	6
Brown, Henry R.	1	1	0
Crook, Herbert	1	1	0
Earnshaw, B. K.	0	10	6
Gibbs, Joseph	1	1	0
Gilbert, Wm. John	0	10	6
Hall, Samuel	1	1	0
Harmer, A. D.	0	5	0
Neve, Miss Annie	0	5	0
East Dereham.			
Peck, Edward	0	5	0
East Grinstead.			
Dixon, W. H.	0	2	6
Tully, John	0	2	6
East Molesey.			
Glazier, W. H.	1	1	0
Parrott, John	0	10	6
Ebbw Vale.			
Orchard, Arthur B. C.	0	5	0
Eccleshall.			
Smith, Edgar R.	0	10	6

Edinburgh.	£	s.	d.
Ainslie, Wm. W.	0	2	6
Aitken, James	0	5	0
Aitken, William	0	5	0
Alexander, H. D.	0	5	0
Arthur, Charles	0	5	0
Baildon, Henry B.	1	1	0
Boa, Peter	0	5	0
Bowman, Edmund	0	5	0
Brown, Robert	0	5	0
Brown, Robert S.	0	5	0
Bruce, Alexander G.	0	5	0
Buchanan, James	1	1	0
Chemists' Assistants and Apprentices' Association	1	1	0
Clark, Alexander G.	0	5	0
Clark, Dr. William Inglis	0	10	6
Coates, Edwin	0	5	0
Coats, J. T.	0	5	0
Cowie, George	0	3	0
Crow, William	0	5	0
Crowden, S. G.	0	5	0
Dewar, F. L.	0	5	0
Dick, Robert	1	1	0
Dick, Robert Gibson	0	5	0
Dott, David B.	0	5	0
Duncan, Adam	0	2	0
Duncan, William	0	5	0
Dunlop, J. B.	0	2	6
Easton, John	0	2	6
Ewing, James L.	0	10	6
Forret, John A.	0	5	0
Fraser, Alexander	0	2	6
Fraser, J. I.	0	5	0
Gamley, David	0	5	0
Gardner and Ainslie	1	1	0
Gardner, W.	0	5	0
Gilmour, William	1	1	0
Gorrie, Daniel	0	5	0
Gray, E. H.	0	2	6
Hall, R. T.	0	2	6
Hannay, L. W. C.	0	10	6
Henderson, W. E.	0	2	6
Hendry, R. L.	0	5	0
Hill, John R.	0	5	0
Keith, Sydney	0	5	0
Laird, George H.	0	10	6
Lockerbie, James	0	5	0
MacAlley, Robert	0	5	0
MacCallam, A. I.	0	5	0
Macdonald, A. M.	0	5	0
Macfarlan and Co.	2	2	0
Macfarlane, Andrew Y.	0	7	6
McGibbon, G. L.	0	5	0
McGlashan, J.	0	5	0
MacLaren, David	0	5	0
Macnair, R. H.	0	2	6
McPherson, Colin A.	0	5	0
Morison, John	0	10	6
Pinkerton, William	0	10	6
Pottage, J. C.	0	10	6
Prentice, John	0	5	0
Purves, Samuel	0	5	0
Raimes, Blanshard and Co.	2	2	0
Robertson, John	0	5	0
Robertson, James and Co.	1	1	0
Scobie, James	0	5	0
Scott, James	0	10	6
Smiles, James	0	5	0
Smith, Thomas	1	1	0
Smith, William	0	5	0
Spence, William	0	5	0
Stephenson, Frederick	0	5	0
Stephenson, J. B.	0	10	6
Steward, A. K.	0	2	6
Stoddart, T. G.	1	0	0
Suttar, John	0	2	6
Symington, Thomas	0	10	6
Thomson, Isaac W.	0	5	0
Thomson, Robert	0	10	0
Turnbull, W. S.	0	2	6
Wilson, James M.	0	5	0
Wylie, David N.	0	5	0
Egham.			
Bartholomew, William	0	10	6
Elgin.			
Robertson, William	0	5	0
Ely.			
Ellis, H. A.	0	2	6
Heading, H. H.	0	10	6
Lincoln. William	0	10	6
Pate, Henry T.	0	10	6
Emsworth.			
Waters, Henry Griffith	0	5	0

Epping.	£	s.	d.
Rowland, Thos.	0	10	6
Rowland, T. W.	0	2	6
Epsom.			
Oxley, Frederic	0	5	0
Tottle, Henry John	0	5	0
Eton.			
Lewis, Charles E.	0	5	0
Evesham.			
Dingley, R. L.	0	5	0
Pumphrey, J. H.	0	5	0
Exeter.			
Bard, Jane	0	2	6
Bottling, Charles	0	5	0
Brailey, Charles	0	5	0
Bromfield, Charles	0	5	0
Broom, W. W.	0	5	0
Bulley, William H.	0	2	6
Cooper, C.	0	5	0
Fouraker, Thomas E.	0	5	0
Gadd, Henry	0	10	6
Harris, Henry W.	0	10	6
Hunt, Arthur	0	5	0
Lake, John H.	1	1	0
Lemmon, Eric	0	5	0
Milton, Thomas C.	0	10	6
Napier, George L.	0	5	0
Newbury, Frank	0	5	0
Pasmore, George	0	5	0
Sanders, W. F.	0	2	6
Stocker, George	0	10	6
Stone, Frederick W.	0	10	6
Tighe, Henry W.	0	10	6
Wearing, W. H.	0	5	0
Wright, Robert F.	0	5	0
Eye.			
Bishop, Robert	0	10	6
Eynsham.			
Howe, Henry A.	0	5	0
Falkirk.			
Lyon, Thomas	0	10	6
Murdoch, David	0	10	6
Falmouth.			
Newman, Walter F.	0	5	0
Solomon, W. H.	0	10	6
Fareham.			
Batchelor, Alfred E.	0	5	0
Batchelor, Charles	0	5	0
Franklin, Alfred	0	10	6
Faringdon.			
Ballard, Arthur	0	10	6
Ballard, Edwin	0	5	0
Farnham.			
Cullingford, L. J.	1	1	0
Griffith, J.	0	10	6
Fenton.			
Massey, Stephen	0	5	0
Weston, Joseph	0	2	6
Fishguard.			
Vaughan, William	0	2	6
Fiji.			
Powell, E. G. B.	0	10	6
Flint.			
Jones, Michael	0	5	0
Jones, O. W.	0	5	0
Florence (Italy).			
Rigden, George	0	2	6
Folkestone.			
Giles, John J.	0	10	6
Goodliffe, George	0	10	6
Lea, Frederick J.	0	5	0
Lea, John	0	10	6
Stainer, John	0	10	6
Fordingbridge.			
Haydon, Frederick W.	0	5	0
Forfar.			
Ranken, James A.	0	5	0
Ranken, John	0	5	0
Fortune's Well.			
Grant, Donald	0	5	0
Foulsham.			
Maddison, Mary	0	5	0
Fraserburgh.			
Burnett, Robert	0	5	0

Frittenden (Kent).	£	s.	d.
Worsley, A. G.	0	5	0
Frome.			
Hodder, G. W.	0	2	6
Gainsborough.			
Forrest, Richard Wm.	0	10	6
Marshall, John Ferris	0	10	6
Garstang.			
Thomas, J. J.	0	5	0
Gateshead-on-Tyne.			
Elliott, Robert	0	10	6
Greenwell, William C.	0	5	0
Smith, E. B.	0	2	6
Glasgow.			
Brodie, Robert	0	5	0
Clarke, Joseph A.	0	5	0
Currie, John (Sauchiehall Street)	0	5	0
Dickie, James	0	10	6
Duncan, Joseph	0	10	6
Dunlop, Thomas	0	5	0
Fenwick, John	0	5	0
Foster, John	0	5	0
Frazer, Daniel	1	1	0
Garry, George	0	2	6
Glasgow Apothecaries' Co.	1	1	0
Glen, Robert	0	5	0
Harrower, Peter	0	5	0
Henderson, John	0	5	0
Illingworth, George S.	0	5	0
Jaap, John	0	10	6
Kinninmont, Alexander	1	1	0
Lawrence, John	0	10	6
McMillan, John	1	1	0
Miller, J. W.	0	5	0
Paris, Walter	0	5	0
Peacock, John R.	0	2	6
Pettigrew, J. W.	0	5	0
Rose, Alexander	0	10	6
Thompson, M. F.	0	5	0
Wallace, William	0	10	6
Ward, William A.	0	5	0
Whitelaw, James	1	1	0
Glass (N.B.).			
Aberdein, James	0	2	0
Glastonbury.			
Diggens, Edward D.	0	2	6
Hulbert, S. J.	0	5	0
Gloucester.			
Berry, Edward	0	5	0
Foulkes, W. H.	0	10	6
Franklin, James	0	5	0
Hughes, Evan G.	0	5	0
Jenkins, Henry	0	5	0
Meadows, Henry	0	10	6
Sadleir, John	0	10	6
Stafford, William	0	10	6
Trigg, James W.	0	5	0
Ward, Joseph	0	10	6
Goole.			
Bentley, J. T.	1	0	0
Gorton.			
Plant, Frank G. L.	0	5	0
Gosforth.			
Gaitskell, James	0	5	0
Gosport.			
French, Benjamin	0	10	0
Hunter, John	0	10	6
Mason, Philip H.	1	1	0
Mumby, Charles and Co.	1	1	0
Smith, W. B.	0	5	0
Wells, A. J.	0	2	6
Govan.			
Skinner, John	0	5	0
Grantham.			
Gibson, John B.	0	10	0
Stewart, James	0	2	6
Whysall, William	0	10	6
Grantown (N.B.).			
Duncan, William	0	5	0
Gravesend.			
Bacon, Henry J.	0	2	6
Bulgin, William	0	5	0
Clarke, Richard F.	0	5	0
Lucas, Joseph M. M.	0	5	0
Spencer, Charles	1	1	0

Grays.	£	s.	d.
Kirby, Samuel John	0	5	0
Great Bedwyn.			
Gerard, George R.	0	10	6
Great Grimsby.			
Cook, Robert, jun.	0	5	0
Mason, William D.	0	2	6
Robinson, Jonathan Scott	0	2	6
Great Malvern.			
Goodsell, Philip G.	0	5	0
Greenock.			
Wilson, Alexander	0	5	0
Guildford.			
Jefferies, Henry	1	1	0
Martin, Edward W.	0	10	6
Thompson, Thomas	0	5	0
Warman, H. T.	0	2	6
Wheeler, Frederick	0	5	0
Guisborough.			
Fairburn, Robert W.	0	5	0
Haddington.			
Watt, James	0	5	0
Halesworth.			
Gostling, John H.	0	5	0
Halifax.			
Brook, Robert	0	10	6
Dyer, William	0	5	0
Jessop, Jonathan	0	5	0
Swire, Jabez	0	5	0
Halstead.			
Hoddy, Benjamin	0	2	6
Marlar, John F.	0	2	6
Hampton.			
Thomas, J. H.	0	2	6
Hanley.			
Charles, Thomas	0	2	6
Cornwell, T. C.	0	5	0
Eardley, James F.	0	5	0
Furnival, John D.	0	5	0
Insull, E. S.	0	5	0
Jones, Edmund	0	5	0
Moore, John William	0	5	0
Scarlett, William	0	5	0
Harleston.			
Goodchild, Alfred C.	0	5	0
Woods, Charles	0	5	0
Harrogate.			
Coupland, Joseph	0	10	6
Davis, Richard H.	0	10	6
Greenwood, Charles	0	10	6
Greenwood, John	0	10	6
Potter, Charles	0	5	0
Pullan, John R.	0	10	6
Reynolds, Freshfield	0	10	6
Hartlepool.			
Jackson, William George	1	1	0
Harwich.			
Harding, Joseph	0	5	0
Worts, Augustine	0	5	0
Haslingden.			
Blayney, Joseph J.	0	5	0
Hastings and St. Leonards.			
Beck, Albert N.	0	5	0
Bell, J. A.	0	10	6
Bolton, Thomas	0	5	0
Brooker, Algernon	0	6	0
Brooks, Frederick	0	5	0
Feaver, John	0	10	6
Jameson, W. E.	1	1	0
Jenner, H. A.	0	5	0
Kernot, Dr. G. C.	0	10	6
Keyworth, G. A.	0	10	0
Maggs, F. W.	0	5	0
Maggs, Samuel B.	0	10	6
Neve, Francis C.	1	1	0
Ripley, E.	0	2	6
Rossiter, Frederick	0	10	6
Snowdon, Robert	0	5	0
Tree, Frederick	0	2	6
Haverfordwest.			
Jenkins, Jabez (Lysyfrân)	0	5	0
Phillips, T. M.	0	5	0
Saunders, Charles P.	0	5	0
Saunders, David P.	0	10	6

Hawick.	£	s.	d.
Craig, John	0	5	0
Kennedy, D.	0	10	6
Maben, Thomas	1	1	0
Hay.			
Davies, John Lutwiche	0	5	0
Heaton Chapel.			
Thorp, John	1	1	0
Hebden Bridge.			
Hey, David	0	10	6
Hey, Thomas K.	0	10	6
Heckington.			
Sumners, Michael Cole	0	5	0
Heckmondwike.			
Booth, John	1	1	0
Stead, Walter	0	5	0
Helensburgh.			
Harvie, George	0	4	0
Helmsdale.			
Fraser, John	0	2	6
Helmsley.			
Allenby, W.	0	5	0
Helston.			
Troake, M. H.	0	5	0
Wakeham, Charles	0	5	0
Hemel Hempstead.			
Argue, James	0	5	0
Henley-on-Thames.			
Hunn, Benjamin	0	5	0
Hereford.			
Chave and Jackson	0	10	6
Clarke, Thomas W.	0	5	0
Gay, E.	0	5	0
Guy, E.	0	5	0
Haines, W. E.	0	5	0
Walker, John	1	1	0
Williams, W. and H. B.	0	10	6
Hertford.			
Lines, George	0	10	0
Hexham.			
Gibson, J. P.	1	1	0
Richardson, George	0	5	0
Riddle, W. R.	0	5	0
Heywood.			
Beckett, William	0	10	6
Hitchin.			
Cave, J. R.	0	2	6
Gatward, Oswald	0	5	0
Marchant, Rev. F. G.	0	2	6
Perks and Llewellyn	1	1	0
Ransom and Son	1	1	0
Hobart (Tasmania).			
Gould, Henry T.	0	2	0
Mason, Michael	0	5	0
Hoddesdon.			
Green, William G.	0	5	0
Holme-upon-Spalding Moor.			
Edwards, F. W.	0	5	0
Hong Kong.			
Crow, W. E.	1	1	0
Woolnough, H. A.	0	10	6
Horncastle.			
Betts, William	0	5	0
Carlton, E. P.	0	5	0
Horndean.			
Bettsworth, Henry T.	0	5	0
Horsforth.			
Wynn, Frederick	0	5	0
Huddersfield.			
Higgins, Tom Sellers	0	10	6
King, William	0	10	6
Swift, C. H.	0	5	0
Sykes, Henry	0	5	0
Wheatley, Charles	0	10	0

Hull.	£	s.	d.
Allison, E. and H.	1	1	0
Bell, Charles B.	1	1	0
Bousfield, W. M.	0	5	0
Campbell, Charles	0	5	0
Chapman, E. J.	0	5	0
Chapman, Joseph	0	2	6
Creasser, Matthew	0	5	0
Desforge, J. H.	0	5	0
Dobson, J. B.	0	5	0
Dolling, Alfred	0	5	0
Dyson, George	0	5	0
Gibson, C. P. (Trustees of)	0	5	0
Gregory, Mrs.	0	2	6
Grindell, John	0	10	6
Hall, Henry R. F.	0	5	0
Hammond, William H.	0	5	0
Hart, George William	0	10	6
Hay, W.	0	2	6
Hebblethwaite, G. A.	0	2	6
Hollingsworth, James	0	5	0
Hoyles, George	0	2	6
Kenny, Thomas	0	5	0
Linford, John S.	1	1	0
Lofthouse and Saltmer	1	1	0
Oldham, James	0	5	0
Parsons H. J.	0	2	6
Raynor, A.	0	5	0
Shaw, Ward	0	5	0
Shepherdson, Welburn	0	10	6
Souter, Jas. S.	0	10	6
Staning, Walter	0	5	0
Staning, William	0	2	6
Stoakes, Benjamin M.	0	5	0
Wokes and Ellis	0	5	0
Hunstanton.			
Twiss, Wm.	0	10	6
Huntingdon.			
Baxter, Robert	0	10	6
Huntly (N.B.).			
Chalmers, G.	0	2	6
Hurstpierpoint.			
Hudson, Alfred W.	0	2	6
Hyde.			
Oldfield, Henry	0	10	6
Hyères (France).			
Powell, Walter A.	0	5	0
Hythe.			
Lemmon, R. A.	1	1	0
Ilfracombe.			
Crang, Walter	0	10	6
Wheeler, James	0	5	0
Ilkeston.			
Potts, Charles	1	1	0
Ilkley.			
Worfolk, G. W.	0	5	0
Ingatestone.			
Stuart, Henry James	0	2	6
Inverness.			
Fraser, John	0	5	0
Galloway and Son	0	10	6
MacRitchie, David	0	5	0
Mitchell, H.	0	5	0
Ipswich.			
Anness, Samuel R.	0	10	6
Chapman and Pain	1	1	0
Clifton, E. S.	0	5	0
Cornell, William	1	1	0
Cossey, James D.	0	5	0
Grimwade, Ridley and Co.	0	10	6
Lyon, Robert	0	5	0
Matcham, Edward	0	5	0
Miller, T. T.	0	5	0
Nunn, C. G.	0	5	0
Spurgeon, Fredk. J.	0	5	0
Wiggin, J. C.	0	10	6
Younger, Robert E.	0	5	0
Irvine.			
Gillespie, James	0	5	0
Isleworth.			
Reece, James	0	5	0
Jarrow-on-Tyne.			
Hooper, Richard	0	2	

Jersey.	£	s.	d.
Baker, John T.	0	5	0
Cole, George	1	1	0
Ereaut, George	1	1	0
Ereaut, John, jun.	1	1	0
Millais, Mrs.	1	1	0
Miller, Henry	0	5	0
Poingdestre, C. R.	0	10	6
Keighley.			
Midgley, Walter	0	5	0
Robinson, Whiteley (Haworth)	0	5	0
Kelso.			
Maxton, William Murray	0	5	0
Kendal.			
Bateson, Thomas	1	1	0
Burton, Matthew	1	1	0
Hind, Thomas W. L.	1	1	0
Rigg, G. F.	0	10	6
Severs, Joseph	1	1	0
Kenilworth.			
Barton, Henry Emlyn	0	10	6
Keswick.			
Townley, Thomas W.	0	10	6
Kettering.			
Denston, John Thomas	0	5	0
Moore, Jonathan R.	0	5	0
Thursfield, John F.	0	4	0
Kew.			
Edwards, J. E.	0	10	6
Kidsgrove.			
Griffiths, Edwin H.	0	10	6
Kilmarnock.			
Borland, John	1	1	0
Borland, John, jun.	0	10	6
Kimberley (South Africa).			
Helmore, W. H.	0	5	0
King's Lynn.			
Atmore, George	0	5	0
Cocher, John A.	0	5	0
Count, Sidney	0	5	0
Kingston-on-Thames.			
Bond, C. R.	0	10	6
Brewster, William	0	10	6
Higgs, Alfred	0	5	0
Walmsley, Samuel	0	5	0
Whaley, Edward	0	10	6
Kington.			
Venables, Samuel H.	0	5	0
Kirby Wiske.			
Wilson, K. J.	0	2	6
Kirkcaldy.			
Storrar, David	1	1	0
Kirkham.			
Buckley, F. H.	0	2	6
Kirton-in-Lindsey.			
Kirk, William P.	0	5	0
Knaresborough.			
Lawrence, W. P.	0	5	0
Thompson, George	0	5	0
Knutsford.			
Silvester, Henry T.	0	5	0
Lancaster.			
Arkle, William	0	5	0
Dickinson, John G.	0	2	6
Holmes, Edward (Bentham)	0	5	0
Troughton, Henry	0	5	0
Vince and Dickinson	0	2	6
Wilcock, John	0	5	0
Landport.			
Alderslade, William	0	5	0
Gall, Frederic	0	2	6
Hackman, Leonard L.	0	10	6
Perfect, George	0	5	0
Langholm.			
Beattie, Thomas	0	5	0

Langport.	s.	d.
Chant, Herbert A.	0	10	6
Hobbes, A. E.	0	5	0
Langtofts.			
Lowther, M. K.	0	2	6
Largs (N.B.).			
Fraser, Alexander	0	5	0
Launceston.			
Downing, Frederick	0	5	0
Love, Charles	0	10	0
White, Thomas	0	10	6
Wise, William	0	5	0
Leamington.			
Barnitt, John	0	10	6
Barrett, Josephus T.	1	1	0
Davis, Benjamin	0	5	0
Holloway, E. A.	0	2	6
Leath and Woolcott	1	1	0
Norman, William F	0	5	0
Pullin, William H.	0	10	6
Robinson, J. J.	0	5	0
Sansom, Henry	0	10	6
Smith, Samuel A.	1	1	0
Smith, Samuel H.	0	5	0
Spilsbury, James	0	5	0
Stanley, Herbert	0	10	6
Ledbury.			
Freeman, Ernest	0	10	6
Leeds.			
Abbott, James	1	1	0
Archer, Joseph S.	0	2	6
Bilbrough, A.	1	1	0
Branson, F. W.	0	10	6
Briggs, George	0	5	0
Brown, Edward	0	10	6
Brown, E. O.	0	5	0
Cole, E. H.	0	10	6
Exley, George	0	5	0
Fawthorp, James	0	5	0
Fourness and Son	0	10	6
Goodall, Backhouse and Co.	2	2	0
Greasley, M. F.	0	10	6
Hardcastle, John	0	5	0
Harvey, William (Headingley)	1	1	0
Hirst, Brooke and Hirst	2	2	0
Hirst, David	0	5	0
Holmes, Francis	0	5	0
Holmes, Joseph	0	10	6
Iredale, Thomas	0	5	0
Morgan, Edward	0	5	0
Payne, E. S.	0	5	0
Reynolds, Richard	1	1	0
Reynolds, Richard F.	0	5	0
Smeeton, William	0	10	6
Smithson, F. W.	0	10	6
Taylor and Fletcher	1	1	0
Taylor, Samuel	1	1	0
Leek.			
Blades, Josiah B.	0	2	6
Johnson, William	0	5	0
Leicester.			
Berridge, Alfred	0	5	0
Broof, R.	0	10	0
Burford, S. F.	0	5	0
Butler, E. H.	0	7	6
Butler, T. E.	0	5	0
Cadoux, S. H.	0	5	0
Carr, William	0	10	6
Clark, E. A.	0	5	0
Clark, John W.	2	2	0
Clark, Walter B.	0	10	6
Cleaver, Samuel	0	5	0
Cooper, Henry	0	5	0
Cox, S. G.	0	10	6
Ellis, George	0	5	0
Esam, Richard	0	5	0
Freeland, A. J. (Kibworth)	0	2	6
Garrett, John	0	5	0
Harvey, William R.	1	1	0
Lloyd, T. H.	1	1	0
Pickering, Henry	0	5	0
Puckey, William	0	5	0
Sharp, Edward K.	0	5	0
Wand, Stephen	0	10	6
West, J. L.	1	1	0
Wilby, Frederick W.	0	10	6
Woolley, G. J. B.	0	5	0
Leigh.			
Bennett, John W.	0	5	0

Leighton Buzzard.	£	s.	d.
Herington, Joseph	1	1	0
Leith.			
Bowman, J.	0	10	6
Crichton, Alexander	0	5	0
Duncan, Flockhart, Powell and Co.	0	10	6
Finlayson, Thomas	0	5	0
Hutchinson, M. H.	0	5	0
McDougall, R. I.	0	5	0
Mair, Alexander	0	5	0
Smith, Wilson and Sutherland	0	10	6
Lenton.			
Wilson, Thomas	0	5	0
Leominster.			
Davis, David F.	1	1	0
Sandiland, Robert B., jun.	0	5	0
Lerwick.			
Porteous, Arthur A.	0	2	6
Leven.			
Gibson, Adam	0	10	6
Lewes.			
Briscoe, Charles (West Firle)	0	5	0
Head, John	0	10	6
Head, John T.	0	10	6
Leyland.			
Hackforth, Frederick	0	10	6
Lincoln.			
Battle, Son and Maltby	0	10	6
Tomlinson, Charles K.	0	10	6
Woodcock, Page D.	0	5	0
Liskeard.			
Young, Richard	0	5	0
Little Brighton.			
Walker, Joseph	0	5	0
Little Chishill.			
Jefferson, Thomas	0	10	6
Littlehampton.			
Longman, J. H.	0	2	6
Smart, C. F.	1	1	0
Little Sutton.			
Sherlock, John	0	5	0
Liverpool.			
Abraham, Alfred Clay	1	1	0
Abraham, Thomas Fell	1	1	0
Adams, Thomas E.	0	10	6
Adams, T. E., jun.	0	5	0
Albright, Henry	0	10	0
Alexander, George	0	5	0
Alexander, John	0	10	6
Allan, James H.	1	1	0
Ashbourne, C.	0	10	6
Ayrton and Saunders	0	10	6
Bain, John	0	5	0
Billington, Frederic	0	5	0
Blabey, J. J. (Woolton)	0	10	6
Blackbourn, H. J.	0	5	0
Blood, Charles (Formby)	0	5	0
Blundell, John	0	10	6
Brown, Edwin	0	2	6
Brown, Joseph	0	2	6
Buck, Richard C.	0	5	0
Chemists' Trade Association	2	2	0
Clark, F.	0	5	0
Clay, Dod and Co.	1	1	0
Coupland, Henry	0	10	6
Dale, John	0	10	6
Dickins, B.	0	5	0
Dod, Thomas H.	1	1	0
Drawbridge, Joseph G.	0	10	6
Drawbridge, T. F.	0	5	0
Driver, John G.	0	5	0
Ellams, George	0	10	0
Elliott, Robert John	0	10	6
Ellis, G. W.	0	5	0
Evans, Sons and Co	5	5	0
Fergusson, W. and J.	0	10	6
Fidler, T. W.	0	5	0
Field, C.	0	10	6
Fleming, Mrs.	0	5	0
Flint, John	0	10	6
Fowler, George	0	5	0
Furniss, Thomas	0	5	0
Greenall, Alfred	1	1	0
Hackett, Thomas	0	10	6

Liverpool—continued.	£	s.	d.
Hanson, Christopher	0	5	0
Hodges, E. G.	0	5	0
Hunt, Thomas	0	10	6
Jackson, H.	0	10	6
James, John	0	5	0
Johnson, E. E.	0	2	0
Johnson J. H. and S.	2	2	0
Jones, R. H.	0	5	0
Lee, Samuel W.	1	1	0
Lett, Arthur J.	0	5	6
Macdonald, John	0	2	6
McGuffie and Co.	1	1	0
MacKinlay, F. J.	1	1	0
Maskery, Samuel	1	1	0
Midgley, John E.	0	2	6
Morgan, H. B.	0	5	0
Parkinson, Richard	0	10	6
Parry, R.	0	5	0
Parry, William	0	5	0
Pershouse, E.	1	0	0
Pheysey, Richard (Waterloo)	0	10	6
Richardson, Richard T.	0	10	6
Ridgway, T. E.	0	5	0
Sawden, Alfred	0	10	6
Sleggs, G. R.	0	5	0
Smith, Henry	0	5	0
Smith, J. J. (Walton-on-the-Hill)	0	5	0
Smith, R. G.	0	5	0
Symes, Charles	3	3	0
Thomas, Robert	0	10	6
Thompson and Capper	1	1	0
Thompson and Co.	1	1	0
Troughton, Christopher	0	5	0
Watson, T. L.	1	0	0
Williams, William	0	5	0
Woodhead, H. C.	0	10	6
Wright, William	0	10	6
Wyatt, H.	0	5	0
Wyatt, H., jun.	0	5	0
Llandilo.			
Williams, W. J.	0	2	6
Llandudno.			
Burton, Joseph	1	1	0
Sinclair, Mrs. M. A.	0	10	6
Llanelly.			
Evans, Gwilym	0	10	6
Jones, W. E.	0	2	6
Llangollen.			
Jones, Humphrey	0	5	0
Llanidloes.			
Jones, Thomas Pryce	0	2	6
Llanrwst.			
Jones, Owen	0	2	6
Loddon.			
Ellis, T. W.	0	10	6
London.			
Allden, John	1	1	0
Allen, Charles B.	2	2	0
Andrews, Frederick	0	10	6
Applegate, Edwin	0	10	6
Arkinstall, William	1	1	0
Arrowsmith, G. W. T.	0	10	6
Ashton, Charles S.	0	5	0
Atkinson, James	0	2	6
Atkinson, John G.	0	5	0
Attwood, Henry E.	1	1	0
Austin, Henry Felix	1	1	0
Babb, James	0	5	0
Bains, Wm. H.	0	10	6
Baker, Alfred P.	0	10	6
Ball, The Chemists', per R. Bremridge	12	12	0
Barnard, John	1	1	0
Barnes, James Benjamin	1	1	0
Barnes, James Burden	0	5	0
Barret, Edward Louis	1	1	0
Barron, Frederick	5	5	0
Barry, Frederic	0	5	0
Bartle, W. F.	0	5	0
Bartlett, G. F. H.	0	5	0
Bartley, George A.	0	10	6
Bascombe, Frederick	0	5	0
Bascombe, William	0	5	0
Bate, Henry	1	1	0
Bathe, Robert S.	0	10	6
Baxter, William	1	1	0
Beasley, Frederick	0	5	0
Beddard, John	1	1	0

London—continued.	£	s.	d.
Bedford, C.	1	1	0
Bell, Matthew W.	1	1	0
Bell, William H.	1	1	0
Bennett, George	0	5	0
Bennett, Thomas	0	5	0
Bently, William Jas.	0	10	6
Bessell, J. W.	0	5	0
Best, James	0	10	6
Bettinson, W. T.	0	5	0
Bevan, William	0	5	0
Bigg, Thomas	1	1	0
Bindloss, G. F.	0	10	6
Bingley, Richard	0	10	6
Birch, Henry C.	1	1	0
Bird, Augustus	2	2	0
Bird and Storey	1	1	0
Bird, Robert	0	10	6
Bishop, Henry	0	2	6
Bishop, W. M.	0	2	6
Blake, Charles A.	0	10	6
Bland, John	0	10	6
Blyth, Utton	0	5	0
Boothby, H. N.	0	5	0
Botwood, Chas W.	0	5	0
Bourdas, Isaiah	1	1	0
Boutall, G. S. (donation)	5	5	0
Bowen, John W.	1	1	0
Brand and Co.	1	1	0
Branford, A. J.	0	2	6
Bridges, C. W.	0	5	0
Bright, Frederick	0	5	0
Brodribb, J. B.	0	10	6
Brookes, Samuel	0	10	6
Brown, Alfred James	0	10	6
Brown, Edgar M.	0	2	6
Buckle, Christopher Francis	0	10	6
Bull, E. John	0	5	0
Bullock, J. Lloyd and Co.	2	2	0
Bunker, James	0	2	6
Burgess, Willows and Francis	1	1	0
Burgoyne, Burbidges, Cyriax and Farries	2	2	0
Burn, Henry	0	5	0
Burnett, J. F.	0	5	0
Burton, Joseph	0	5	0
Bush, Arthur	0	5	0
Butler, Charles	0	10	6
Butler, E. D. Barry	0	10	6
Butt, Edward Northway	5	5	0
Butterfield, E.	0	9	0
Butterworth, John	0	5	0
Cadman, Daniel C.	1	1	0
Campbell, E. K.	0	3	0
Carteighe, Michael	1	1	0
Cartwright, William B.	0	10	6
Caseley, Thomas	0	5	0
Catterns, Heneage P.	0	10	6
Cawdell, George	0	10	6
Chapman, Joseph J.	0	10	6
Chapman, Walter	0	10	6
Charity, William	0	10	6
Chesterfield, T. M.	0	2	6
Churchill, J. and A.	1	1	0
Clapham, John	0	2	6
Clapp, Edward F.	0	10	6
Clark, John A.	0	10	6
Clark, Thomas J.	0	10	6
Clarke, Isabella Skinner	0	10	6
Clarke, W. L.	0	5	0
Clift and Crow	1	1	0
Cocker and Son	0	10	6
Cocksedge, H. B.	0	10	6
Colchester, William M.	0	5	0
Colchester, William M., jun.	0	5	0
Cole, A. C.	1	1	0
Coleman and Co.	0	5	0
Coles, Ferdinand	0	10	6
Coles, J. W.	0	10	6
Collett, Chas. B.	0	5	0
Collier, Henry	0	5	0
Constance, Edward	0	10	6
Constance, Herbert E.	0	10	6
Constance, Sidney W.	0	10	6
Cook, W. R.	0	5	0
Cooper, Albert	1	1	0
Cooper, Henry	0	10	6
Cooper, Wm. Henry	0	10	6
Cooper, William Temple	0	10	6
Corbyn, Stacey and Co.	1	1	0
Cosway, Edwin C.	0	10	6
Cottrill, John W.	0	10	6
Couper, F.	0	10	6
Cox, F. H.	0	2	6
Cracknell, Herbert	0	5	0
Cranwell, W. B.	1	1	0
Cripps, R. A.	0	5	0
Crosby, John	0	2	6

London—continued.	£	s.	d.
Croyden, Charles	0	10	6
Cryer, Henry	0	5	0
Cull, Joseph	0	10	6
Cullen, Harry H.	0	5	0
Dampney, Richard S.	0	10	6
Darby and Gosden	2	2	0
Davenport, Horace	2	2	0
Davenport, J. T.	2	2	0
Davies, E. C. J.	0	5	0
Davies, Llewelyn	0	2	6
Davies, Robert H.	1	1	0
Davis, H. S. E.	0	10	6
Davy, Yates and Routledge	2	2	0
Deacon, Frederick G.	0	5	0
Dean, S.	0	5	0
De Peare, John Thomas	0	5	0
Dewar, Mary Ann	0	10	6
Dinneford and Co.	2	2	0
Doulton and Co.	1	1	0
Drury, Sydney	0	5	0
Dymott, Francis	0	5	0
Dyson, William B.	1	1	0
Eade, George	0	10	6
Eade, James	0	10	6
Eastman, J. E.	0	10	6
Edwards, Charles	1	1	0
Edwards, William Staples	0	5	0
Elliott, J. D.	0	10	6
Ellwood, T. A.	0	5	0
Elvey, Thomas	1	1	0
Emslie, Joseph	0	5	0
Emson, William N.	0	5	0
Epps, James	1	1	0
Evans, Lescher and Webb	1	1	0
Evershed, G. S.	0	5	0
Fallowfield, Jonathan	1	1	0
Farmer, John	0	10	6
Farr, Edward H.	0	10	6
Feltwell, John	0	10	6
Ferguson, W. H.	2	2	0
Fitch, Robert Owen	0	10	6
Fitt, Francis E.	0	10	6
Forrest, Richard	1	1	0
Fox, William	1	1	0
Francis, G. Bult	1	1	0
Francis, George Baggett	1	1	0
Francis, Matthew R.	0	10	6
Francis, W. H.	0	10	6
Frith, E. J.	0	5	0
Froom, William Henry	1	1	0
Frost, John H.	0	5	0
Frost, W. T.	0	10	6
Fryer, Arthur	0	5	0
Gadd, Charles	0	10	6
Gadd, Robert	0	10	6
Gale, Samuel	1	1	0
Gange, George	0	5	0
Garman, C. E.	0	5	0
Garner, James	0	10	6
Garner, Thomas	0	5	0
Garnham, A. W.	0	5	0
Gaunt, Rann Dolphin H.	1	1	0
Gedge, William S.	0	10	6
Gerrard, A. W.	1	1	0
Glasspoole, H. G.	0	10	6
Godfrey, H. E.	0	5	0
Godolphin, George F. A.	0	10	6
Goff, Richard	0	5	0
Golding, John F.	1	1	0
Golds, L. G.	0	10	6
Goodall, William A.	0	5	0
Goodger, David	0	10	6
Goodwin, John	1	1	0
Gorton and Sons	0	10	6
Gossling, William R.	0	5	0
Gossop, George K.	0	5	0
Gower, A. J.	0	5	0
Gradidge, James H.	0	2	6
Granger, Edwin John	1	1	0
Green, Samuel	0	5	0
Green, W. J.	0	10	6
Greenish, H. G.	0	10	6
Greenish, Thomas	1	1	0
Greenish, T. Edward	0	10	6
Greig, William	0	2	6
Griffiths, Alfred William	0	10	6
Griffin, J.	0	2	6
Gristock and Co.	1	1	0
Groves, H. F.	2	2	0
Gudgen, Frederick G.	0	5	0
Gulliver, William	0	10	6
Gulliver, W. F.	0	5	0
Haddock, James	0	5	0
Hadfield, H. M.	0	5	0
Hairsine, H. S.	1	1	0
Hall, Ralph	0	10	6
Hampson, Robert	1	1	0
Hanbury, Cornelius	1	1	0
Hardy, Samuel C.	1	1	0
Harris, Daniel R.	0	10	6
Harris, Frank William	0	5	0
Hart, Thomas	0	5	0
Harvey, Edward	1	1	0
Harvey, John William	0	5	0
Harvey, William	0	5	0
Harwood, Charles	0	10	6
Hatfield, George B.	0	10	6
Hatfield, George W.	0	5	0
Hawkins, Thomas	0	10	6
Hayhoe, W.	0	5	0
Hayward, Charles	0	10	6
Hearn, John	0	5	0
Heath, Frederick D.	0	5	0
Heathcoat, Thomas	0	10	6
Hemingway, Alexander	2	2	0
Henty, Henry Martin	0	5	0
Herbert, William	0	5	0
Hewlett, J. C.	1	1	0
Hickey, Evan Lewis	0	10	6
Hickman, William	0	10	6
Hicks, Alexander	0	2	6
Higgins, James	0	10	6
Hill, Arthur B.	1	1	0
Hill, Arthur S.	2	2	0
Hill, William	0	5	0
Hillen, John	0	10	6
Hills, Henry William	0	10	6
Hills, Thomas Hyde	10	10	0
Hills, Walter	2	2	0
Hobbs, John K.	0	5	0
Hodgkinson, George A.	0	10	6
Hodgkinson, Stead and Treacher	2	2	0
Hodgkinson (Thomas), Prestons and King	2	2	0
Hodgkinson, William	1	1	0
Hodgson, Alfred	0	5	0
Hodsoll, Thomas W. H.	1	1	0
Hogg, E. G.	0	10	6
Hogg, Robert	0	10	6
Holford, T. Constantine	0	10	6
Holl, Edmund	0	5	0
Holmes, Alfred J.	0	10	6
Holmes, Walter M.	0	10	6
Hooper, Leonard	0	10	6
Hopkin, William King	2	2	0
Hora, Henry Whinfield	1	1	0
Hora, W. T.	0	5	0
Horne, John	0	5	0
Horncastle, John	1	1	0
Horsley, Thomas W.	0	10	6
Howard, E.	0	5	0
Howard, George	1	1	0
Howell, Maurice	0	10	6
Howes, W. F.	0	5	0
Howlett, Samuel	1	1	0
Hudson, T. F.	0	5	0
Huggett, Sydney	0	10	6
Huggins, Richard	0	10	6
Hughes, Evan	0	10	6
Hugill, John	1	1	0
Hugill, John H.	1	1	0
Humpage, Mrs.	0	10	6
Hunt, Charles	1	1	0
Huskisson, Henry Owen	1	1	0
Hyslop, John Cahill	1	1	0
Icke, Henry S.	0	10	6
Idris and Co.	2	2	0
Ingham, John	0	5	0
Ingram and Royle	1	1	0
Ive, William	1	1	0
ditto (donation)	5	5	0
Izod and Son	1	1	0
Jackson, Charles	0	10	6
Jackson, Christopher	0	10	6
Jackson, Walter	0	5	0
Jackson, William F.	0	10	6
Jameson, W. G., jun.	1	1	0
Jarvis, John S.	0	10	6
Jay, Daniel Harmer	0	5	0
Jenkins, Henry	1	1	0
Jobson, Thomas	0	10	6
Johnson and Sons	1	1	0
Jones, Edwin	0	5	0
Jones, George	0	5	0
Jones, Henry Stevens	0	5	0
Jones, John H.	0	10	6
Jones, Llewellyn	0	5	0
Jones, Thomas	0	5	0
Jones, William	0	10	6
Jones, William	0	5	0
Jones, William	0	5	0
Jones, William	0	2	6
Jones, William John	0	10	6
Jones, William O.	0	10	6
Keeling, A. G.	0	10	6
Keer, Thomas H.	0	10	6
Kelly, Philip A.	0	5	0
Kemp, Robert	0	10	6
Kent, James S.	0	10	6
Kent, Thomas	0	10	6
Kent, Thomas Ramsey	0	10	6
King, Henry	0	10	0
King, William	0	5	0
Kingsford, Frederick	1	1	0
Kinross, W. M.	0	5	0
Kirk, Snowden	0	10	6
Kirkham, Frank	0	2	6
Lance, W. N. G.	0	10	6
Langley, Frank C.	0	5	0
Lavers and Son	0	10	6
Laws, John	0	10	6
Layng, R. C.	0	5	0
Leath and Ross	2	2	0
Legg, H. A.	0	10	6
Lescher, Joseph S.	1	1	0
Lewinton, Alexander B.	1	1	0
Littlejohn, A.	0	5	0
Llewhelin, Ivor V.	0	2	6
Lloyd, Thomas	0	10	6
Long, Henry	1	1	0
Longley, Charles	0	5	0
Lovegrove, G. E.	0	5	0
Lowe, William E.	2	2	0
Luff, Richard	0	10	6
Lynn, John R.	0	2	6
Lyon, James	0	10	6
MacCrindle, Thomas	1	1	0
McDiarmid, F.	0	5	0
Macdonald, Alexander	0	5	0
McDougall, James	0	2	6
MacEwan, Peter	0	10	6
MacGeorge, William	0	10	6
McIntyre, William	0	10	0
McKnight, John	0	5	0
Madeley, E. S.	0	10	6
Maizey, E.	0	10	6
Mallett, Thomas J.	0	10	6
Marks (Henry) and Sons	1	1	0
Marsh, E. R.	0	10	6
Marshallsay, Richard James	0	5	0
Marston, John Thomas	0	10	6
Marten, Frederic	0	5	0
Martindale, William	1	1	0
Mason, H. C.	1	1	0
Mathews, Henry	0	10	6
Mathews, J. H.	0	10	6
Matthews, E. S.	0	10	6
Matthews, J. H.	0	5	0
Maw, Charles	1	1	0
Maw, C. Trentham	1	1	0
Maw, Son and Thompson	2	2	0
Meggeson and Co.	1	1	0
Mellin, Charles J.	0	5	0
Menhinick, C. H. F.	0	2	6
Merrell, James	1	1	0
Michie, Charles C.	0	5	0
Middleton, Francis	1	1	0
Miller, Cecil B.	0	5	0
Miller, Charles S.	0	5	0
Miller, F.	0	5	0
Millhouse, H. H.	0	5	0
Mills, W. D.	0	2	6
Minshull, Flora	0	5	0
Minshull, Rose C.	1	1	0
Moore, John	0	5	0
Morrell, F. K.	0	5	0
Morrell, Thomas	0	5	0
Mortiboy, John	1	1	0
Moss, Thomas A.	0	2	6
Mowatt, J. Rodman	0	5	0
Mutch, John Pratt	0	5	0
Muter, Dr. John	3	3	0
Myers, William	0	5	0
Naylor, W. A. H.	0	10	6
Newton, T. A. C.	0	10	6
Newzam, Henry Samuel	0	10	6
Nicholls, Reginald E.	0	5	0
Nicholson, Thomas T.	0	5	0
Nicholson, W. O.	0	10	6
Nind, George	0	10	6
Ninnis, T. M.	0	5	0
Nobbs, W. M.	0	10	6
Norburn, A. H.	0	5	0
Northen, Charles	0	5	0
Notcutt, W. B.	0	5	0
Ord, Septimus W.	0	5	0
Orpe, Thomas M.	0	10	6
Padman, Dr. Thomas	0	10	6
Palmer, Francis	0	10	6
Palmer, Frank T.	0	2	6
Palmer, Robert	1	1	0

London—continued.	£	s.	d.
Paramore, Dr. R.	0	5	0
Parker, Robert Henry	0	10	6
Parkes, J. C.	0	10	6
Parkes, J. P.	1	1	0
Parkinson and Son	1	1	0
Parrott, Joseph	0	10	6
Parry, C. D.	0	5	0
Parsons, G. H.	2	2	0
Pasmore, J. H.	0	10	6
Passingham, G. W.	0	10	6
Pattison, George	1	1	0
Peacock, George	0	5	0
Peat, Joseph	0	5	0
Peel, Alfred	0	10	6
Penrose and Son	1	1	0
Pepper, John	0	10	6
Pettinger, Elmer	0	5	0
Pharmacy Club (per Richard Bremridge, Hon. Sec.)	10	10	0
Phillips, A. J.	0	5	0
Phillips, A. W.	0	2	6
Philpott, F. W.	0	5	0
Pickard, William	2	2	0
Pidduck, J. W.	0	10	6
Pinyon, William	0	10	6
Plaister, W. J.	1	1	0
Plowman, Sidney	1	1	0
Pond, B. C.	0	5	0
Pope, A. H.	0	5	0
Potts, Robert A.	1	1	0
Powell and Sons	1	1	0
Powell, T. H.	1	1	0
Preston, Richard	0	10	6
Pretty, Charles	0	5	0
Price, Robert John	0	2	6
Prichard, Edward	1	1	0
Prime, Thomas R.	0	10	6
Pumphrey, Arthur	0	2	6
Puntan, H. H. C.	0	2	6
Radermacher, C. J.	0	10	6
Ragg, William	1	1	0
Ragg, W. W.	0	10	0
Rawlinson, Ralph	1	1	0
Read, John Henry	0	5	0
Reed, Charles W.	0	10	6
Rees, Harding	0	10	6
Richardson, James	0	5	0
Richardson, John	0	5	0
Ridding, William	0	10	6
Roach, H. W.	1	1	0
Roach, Pope	1	1	0
Robertson, George	0	10	6
Robinson, Charles J.	0	10	6
Robinson, R. A.	0	10	6
Robinson, William P.	0	10	6
Rogers, James	0	10	6
Rose, Alfred	1	1	0
Rouse, F. W.	0	10	6
Rowntree, Thomas	0	10	6
Rowson, Henry	1	1	0
Rutter, Edmund Yates	1	1	0
Rutter, John	0	5	0
Sadler, William	0	10	6
Sadler, William, jun.	0	5	0
Sandell, Thomas O.	0	10	6
Sanders, Francis T.	0	5	0
Sandford, Geo. W.	2	2	0
Sandy, Frederick William	0	10	6
Sangster, Arthur	1	1	0
Saunders, C.	0	10	6
Saunders, Thos. S.	1	1	0
Savory and Moore	3	3	0
Scoley, Thomas E.	0	5	0
Sedcole, J. W.	0	10	6
Sell, W. H.	0	10	6
Selleck, Edward	0	10	6
Senier, Harold	0	10	6
Shacklock, J. H.	0	5	0
Shapcott, W. H. P.	0	2	6
Sharman, Wm.	0	5	0
Shaw, J. W.	0	10	6
Shephard, Thomas F.	0	10	6
Shepley, Frederick Thos.	0	5	0
Sherburn, Thomas	0	10	6
Sherwood, N.	0	5	0
Shields, R. H.	0	5	0
Shirley, J. G.	2	2	0
Shirley, S. S.	0	10	6
Silverlock, Henry	5	5	0
Silvers, Francis T.	0	10	6
Sims, C. R. H.	0	5	0
Skinner, Robert	0	10	6
Slack, Josiah W.	0	10	6
Slipper, James	0	10	6
Smart, John	0	10	6
Smart, W.	0	10	6
Smith, Harry J.	0	2	6
Smith, James W.	0	5	0
Smith, John Ord	1	1	0
Smith, Percy John	1	1	0
Smith, William	0	10	6
Smith, William Frederick	1	1	0
Smith, William L.	0	10	6
Snell, Charles H.	0	5	0
ditto (donation)	5	5	0
Soole, J. H.	0	5	0
Spyer, Newton	0	10	6
Squire and Son	5	5	0
Stacey, Samuel Lloyd	1	1	0
Stacy, Frederick	0	5	0
Stammwitz, Louisa	1	1	0
Stamp, Edward B.	0	10	6
Stansfield, Richard	0	5	0
Starkie, Richard S.	1	1	0
Steed, Robert O.	0	5	0
Stenson, Joseph	0	5	0
Stephens, Henry I.	0	5	0
Stevens, Felix	0	5	0
Stevens, Peter Augustus	0	10	6
Stickland, W. H.	1	1	0
Stoneham, Philip	0	10	6
Strachan, John	0	10	6
Streater, James H.	0	10	6
Strickett, John	0	10	6
Strongitharm, W. G	0	5	0
Strother, C. J.	0	10	6
Sugden, W. A.	0	5	0
Summers, James R.	0	10	6
Swift, Francis	0	10	6
Symons, William H.	1	1	0
Tanner, A. E.	0	10	6
Taplin, William Gilbert	1	1	0
Taubman, Robert	0	10	6
Taylor, George S.	1	1	0
Taylor, Horatio	0	10	6
Taylor, John	0	10	6
Taylor, Peter	0	5	0
Tebbutt, Edwin	0	15	0
Tharle, C. A.	0	2	6
Thomas, Harry A.	1	1	0
Thomas, Henry	1	1	0
Thomas, Horace	1	1	0
Thomas, Richard	0	10	6
Thompson, Arthur S.	0	5	0
Thompson, C.	0	10	6
Thompson, Henry	0	10	6
Thompson, Henry Ayscough	1	1	0
Thompson, John	1	1	0
Thorn, John James	1	1	0
Tijou, Tom	0	5	0
Tingle, Ellen	0	5	0
Tomlinson, Thomas	1	1	0
Tompsett, Leighton S.	0	5	0
Trask, Thomas	1	1	0
Tregear, A. F.	0	5	0
Trick, William B.	0	10	0
Trotman, Alfred C.	0	10	0
Truman, H. V.	0	5	0
Tudor, W. T.	0	2	6
Tugwell, Ernest H.	0	10	6
Tugwell, William H.	0	10	6
Turner, Charles E.	0	10	6
Turner, Edward A.	1	1	0
Turner, R. C.	0	5	0
Tyrer, Peter	0	10	0
Upjohn, Francis W.	0	5	0
Van, Frederick W. S.	0	5	0
Vaughan, John	0	5	0
Vialls, J. B.	1	1	0
Vincent and Son	1	1	0
Walker, Byatt A.	0	5	0
Walker, Charles	0	5	0
Walker, Troke and Co.	1	1	0
Wallbridge, H. A.	0	5	0
Wallis, John T. W.	0	10	6
Wallis, Owen	0	10	6
Ward, Francis	0	10	6
Waring, A. W.	0	5	0
Warren, Frederick	0	5	0
Warren, William	0	10	6
Wastie, Francis	0	10	6
Watson, William	0	10	6
Watts, Alfred	0	5	0
Watts, Edward	0	5	0
Watts, Harry G.	0	5	0
Watts, J. N.	1	1	0
Watts, John W.	0	10	6
Wavell, Edward	1	1	0
Wegg, W. N.	0	5	0
Wells, Thomas	0	5	0
Weston, Samuel John	1	1	0
Westrup, Joseph B.	0	10	6
Whiffen, Thomas	5	5	0
Whigham, Robert L.	0	5	0
White, Charles	1	1	0
White, Charles E.	0	5	0
Whittle, Elias C. C.	0	5	0
Wickham, W.	0	10	6
Wigg, Henry J.	1	1	0
Wigg, L. N.	0	2	6
Wiggins, Henry	0	10	6
Wigginton, Alfred	0	5	0
Wilde, Francis	0	2	6
Wilkes and Rich	0	10	6
Wlkinson, Benjamin John	0	10	6
Wilkinson, Robert	0	2	6
Wilkinson, Thomas	1	1	0
Wilkinson, William	0	10	6
Wilkinson, W. H.	0	5	0
Will, William W.	0	5	0
Willats, Richard	0	5	0
Williams, Alfred	0	2	6
Williams, Hugh	0	5	0
Williams, John	2	2	0
Williams, Joseph J.	0	5	0
Williams, J. W.	1	1	0
Williams, Stephen	0	5	0
Williams, Thomas H.	0	10	6
Wilson, Alexander W.	0	5	0
Wilson, James	1	1	0
Wilson, John C.	0	10	6
Wilson, Joseph	0	5	0
Wilson, Thomas W.	0	10	6
Wisken, Robert	0	5	0
Wodderspoon and Co.	1	1	0
Wood, C. H.	0	10	6
Woodland, John	1	1	0
Woolldridge, John	0	10	6
Woollings, Frank	0	2	6
Wooster, J. R.	1	1	0
Wootton, Alfred C.	2	2	0
Wright, Layman and Umney	2	2	0
Wyatt, Francis J.	0	10	6
Wylde, George	0	10	6
Yates, Samuel P.	0	5	6
Yeatman, F. J.	0	2	6
Young, George	0	5	0

Long Bennington.

Bemrose, John	0	10	6

Longton.

Prince, Arthur G.	0	10	0

Looe.

Poad, John	0	5	0

Lossiemouth.

Bremner, James	0	5	0

Loughborough.

Handley, Thomas	0	10	6
Scrase, Richard	0	5	0

Louth.

Hurst, John	0	5	0
Moody, S. W.	0	5	0

Lowestoft.

Chaston, Anna Maria	0	10	6
Good, Thomas	0	10	6
Moverley, Robert	0	10	6

Ludlow.

Cocking, George	0	5	0
Marston, Alfred	0	5	0
Nickson, James	0	5	0
Smith, F. W.	0	2	6
Woodhouse, George	0	5	0

Luton.

Hall, Ephraim	0	5	0
Webb, John H.	0	2	6

Lutterworth.

Brown, Thomas	0	10	6

Lyme Regis.

Henley, George	0	5	0

Lymington.

Allen, Adam U.	0	5	0
Badcock, Henry	0	5	0

Lymm.

Evans, Isaac H.	0	5	0
Henshall, James	0	5	0

Lytham.	£	s.	d.
Crozier, R.	0	5	0
Hartley, John	0	5	0
Macclesfield.			
Bates, William I.	0	10	6
Bower, John	0	5	0
Charge, A. W.	0	5	0
Cooper, Thomas	0	5	0
Duncalf, Thomas H.	0	10	6
Wood, Richard	0	10	6
Maidenhead.			
Barry, Thomas S.	0	10	6
Cottingham, Joseph J.	0	5	0
Walker, John W.	0	5	0
Walton, Ralph	0	10	6
Maidstone.			
Corfe, Alfred	0	5	0
Ridley, Charles H.	0	5	0
Rogers, William	0	5	0
Rowcroft, Albert E.	0	5	0
Simpson, John W. G.	0	10	6
Stonham, Thomas G.	0	10	6
Maldon (Essex).			
Crick, George E.	0	10	6
Elsey, Charles	0	5	0
Wallworth, David	0	10	6
Malmesbury.			
Ratcliffe, H. N.	0	10	6
Malton (Yorks).			
Buckle, James	0	5	0
Hardy, George	0	5	0
Harrison, William	0	10	6
Laverack, W. H.	0	5	0
Malvern.			
Coldwell, David B.	0	10	6
Fox, T.	0	5	0
Malvern Wells.			
Clark, Edward J.	0	5	0
Wakefield, Cecil H.	1	1	0
Manchester.			
Ashworth, R.	0	5	0
Balmforth, A.	1	1	0
Bates, Frederic W.	0	5	0
Benger, F. Baden	1	1	0
Bew, John	1	1	0
Billington, John	0	2	6
Bird, F. C. J.	0	2	6
Blyton, John	0	10	6
Boor, Frederick	0	10	6
Booth, William G.	0	10	6
Breadner, C. G.	0	2	6
Brown, William Scott	1	1	0
Bushby, Thomas	0	5	0
Carter, William	0	10	6
Casey, Edward	0	2	6
Darling, William	1	1	0
Dawson, Robert	0	5	0
Elborne, William	0	5	0
Gibbons, Thomas G.	1	1	0
Gibbons, Walter	0	10	6
Gibson, Robert	1	1	0
Hall, Henry Stacey	0	5	0
Hart, James	1	1	0
Hughes, Evan G.	0	10	0
Jackson, George	0	10	6
Jackson, Thomas	0	10	6
Jones, P. V	0	5	0
Kemp, Harry	0	5	0
Lane, William	0	5	0
Marsden, Thomas B. (Withington)	0	5	0
Maunder, Robert	0	10	6
Morris, J. L.	0	5	0
Mundey, H.	0	5	0
Newbould, Thomas A.	0	10	6
Nuttall, R. H.	1	0	0
Oakey, Joseph	0	5	0
Paine, Standen	1	1	0
Pickup, Robert L.	0	10	6
Pidd, Arthur J.	0	10	6
Pigot, Samuel	0	2	6
Roberts, W. R.	0	5	0
Rowland, E. E.	0	5	0
Royle, John	0	5	0
Saunderson, George C.	0	10	0
Scaife, Samuel	0	10	6
Standring, Son and Co.	1	1	0
Sugden, Samuel	0	5	0
Sutcliffe, C. H.	0	5	0
Swinn, Charles	1	1	0
Teasdale, C.	0	10	6
Terry, Thomas (Withington)	0	5	0
Turner, W. S.	0	10	6
Twemlow, Richard	0	10	6
Wealthall, Alfred	0	10	0
West, Thomas	0	5	0
Westmacott, George H.	0	10	6
Wheeldon, James	0	5	0
Whittaker, Ellis (Salford)	0	10	6
Wilkinson, George	0	5	0
Wilkinson, William	1	1	0
Williams, J. B.	0	5	0
Woolley, Sons and Co.	3	3	0
Wright and Barnaby	1	1	0
Yates, Ebenezer	0	5	0
Mansfield.			
Adams, Benjamin	1	1	0
Oldham, John	0	10	6
Patterson, Douglas J.	0	10	0
March.			
Davies, Peter H.	0	5	0
Vawser, Jesse	0	2	6
Margate.			
Baily, John	0	10	6
Candler, Joseph T.	0	10	6
Compton, Arthur	0	5	0
Gale, Henry	0	10	6
Harvey, William S.	0	10	6
Wootton, Edward S.	0	10	6
Market Drayton.			
Cooke, William H.	0	5	0
King, William George	0	10	6
Market Harborough.			
Deacon, Fanny E. (Fleckney)	0	5	0
Maryport.			
Cockton, John	0	5	0
Masham (Yorks).			
Barker, Mathew M.	1	1	0
Matlock Bath.			
Platt, William	0	5	0
Mayfield.			
White, Edward A.	0	5	0
Melbourne (Victoria).			
Cunningham, Oscar W.	0	2	6
Jackson, A. H.	1	1	0
Melrose.			
Bogie, Thomas	0	5	0
Middlesborough.			
Buck, Thomas	0	5	0
Harrington, P. J.	0	5	0
Hume, William A.	0	5	0
Sowerby, Richard	0	5	0
Taylor, H. H.	0	5	0
Taylor, William R.	0	5	0
Millom.			
Roberts, John L.	0	2	6
Minchinhampton.			
Simpkins, John	0	10	6
Mintlaw (N.B.).			
Hardie, Alexander	0	5	0
Mirfield (Yorks).			
Crook, Charles	0	5	0
Mold.			
Evans, William	0	5	0
Montrose.			
Burrell, George	0	5	0
Davidson, A.	0	5	0
Morecambe.			
Birkett, John	0	5	0
Morpeth.			
Marshall, G. T.	0	5	0
Mussoorie (India).			
Graham, Henry	0	5	0
Samuel, James B. and Edward	1	1	0
Nantwich.			
Manley, Henry (Aston)	0	2	6
Naples.			
Bateman, J. M.	1	3	11
Neath.			
Hutchins, Charles	0	2	6
Needham Market.			
Harrington, Allen	0	10	6
Nelson.			
Collins, M. A.	0	5	0
Newark.			
Bennett, William	0	5	0
Cooling, W. J.	0	5	0
Fisher, Harry	0	5	0
Foster, H. P.	0	5	0
March, William	0	5	0
Taylor (John) and Son	0	10	0
New Barnet.			
Young, Robert Fisher	0	10	
New Brighton.			
Rose, Charles	0	5	0
New Brompton (Kent).			
Willis, Henry J.	0	5	
Newbury.			
Davis, Henry J.	0	5	0
Hickman and Metcalf	0	10	6
Pratt, Thomas H.	0	5	0
Newcastle-on-Tyne.			
Bolan, John	0	10	6
Coates, John M.	0	10	6
Coxon, I.	0	2	6
Dean, Edward	0	2	6
Forster, J. R.	0	5	0
Frater, G.	0	5	0
Gooderham, Rev. A.	1	1	0
Hunter, Frederick W.	0	5	0
Ismay and Sons	0	10	6
Mann, Robert	0	10	6
Marley, William	0	10	6
Martin, N. H.	1	1	0
Mawson, T. O.	0	10	6
Owen, William	0	10	6
Proctor, Barnard S.	1	1	0
Proctor, William	0	5	0
Rheeder, T.	0	5	0
Richardson, Alexander	0	5	0
Richardson, George	0	5	0
Robinson, John T.	0	2	6
Scott, Walter	0	5	0
Smith, G. F.	0	5	0
Spargo, H.	0	5	0
Stuart, Charles E.	0	10	6
Ward, Benjamin	0	5	0
Watson, John	0	5	0
Watson, Mason	0	10	6
Weddell, George	0	10	6
Wilkinson, T. T.	0	5	0
Wray, E.	0	2	6
Wright, Alfred	0	10	6
Newcastle-under-Lyne.			
Cartwright, William	0	10	6
Heathcote, Thomas S.	0	10	6
New Clee.			
Barker, William	0	5	0
Newhaven.			
Miller, Alexander	0	3	0
Newmarket.			
Barrow, Frank A.	1	1	0
Sheffield, A. J.	0	5	0
Newport (Isle of Wight).			
Millidge, Alfred	0	5	0
Shepperd, William J.	0	2	6
Smith, Robert	0	5	0
Newport (Mon.).			
Atkins, A. E.	0	5	0
Evans, David	0	5	0
Faulkner, H.	0	5	0
Garrett, T. P.	0	5	0
Gratte, Henry J.	0	5	0

Newport (Mon.).—continued.	£	s.	d.
Paine, Charles	0	10	6
Phillips, James W.	0	5	0
Phillips, John	0	10	6
Seys, James A.	0	5	0
Smith, Albert	0	5	0
Young, John	0	10	6
Newport (Salop).			
Picken, Thomas William	0	10	6
Newport-on-Tay.			
Gardiner, David	0	2	6
New Quay.			
Davies, David	0	2	6
New Radford.			
Jenkins, John Thomas	0	5	0
Newton Abbot.			
Stiling, John E.	0	10	6
Wright, W.	0	5	0
Newton Stewart.			
Keith, John	0	2	6
Newtown (Mont.).			
Morgan, Richard	0	10	6
Norbiton.			
Greenwood, J.	0	10	0
Normanton.			
Cowburn, William	0	5	0
Farnsworth, W.	0	5	0
Northallerton.			
Fairburn, Joseph	0	10	6
Northampton.			
Ashford, Evan Charles	0	5	0
Barry, James	1	1	0
Bingley, John	0	10	6
Gulliver, George E.	0	5	0
Kirby, Frederick	0	5	0
Mayger, William D.	1	1	0
Negus, Samuel T.	0	5	0
Saul, W. B.	0	2	6
Sindall, J. W. (Executors of)	0	5	0
Thorpe, T. F.	0	5	0
Woolston, Thomas H.	0	5	0
North Kelsey.			
Dixon, James	0	3	0
North Walsham.			
Bailey, George Wm.	0	5	0
Northwich.			
Lee, William	0	5	0
Norwich.			
Betts, George	0	10	0
Caley, Albert J.	0	10	6
Corder, Edward	0	10	6
Corder, Octavius	1	1	0
Cossey, John	0	5	0
Cripps, Johnson (Hackforth)	0	5	0
Dyson, Archibald	0	5	0
Gardiner, W.	0	5	0
King, H. A.	0	5	0
Mallett, H. P.	0	5	0
Nuttall, Edwin	0	10	6
Playford, F. W.	0	2	6
Robinson, James	0	5	0
Sutton, Francis	0	10	6
Taylor, H. E.	0	5	0
Thompson, H.	0	5	0
Watson, J. E. H.	0	10	6
Nottingham.			
Beilby, A. E.	0	5	0
Beverley, R. H.	0	5	0
Dadley, Elijah	0	10	6
Fletcher, Thomas B.	0	5	0
Flowerdew, W. C.	0	2	6
Gill, William	0	5	0
Lumby, Fred	0	5	0
Manfull, H. J.	0	5	0
Middleton, A.	0	5	0
Oakland, Charles	0	5	0
Parker, W. H.	0	10	0
Pearson, Edward	1	1	0
Rayson, J. T.	0	5	0

Nottingham—continued.	£	s.	d.
Roberts, Herbert	0	2	6
Robinson, Joseph	0	10	6
Shippam, Henry	0	2	6
Smithurst, John	0	5	0
Taylor, Thomas C.	0	10	6
Watkinson, Thos.	0	2	6
Whitworth, John	0	10	6
Wilford, J.	0	10	6
Nuneaton.			
Iliffe, George	0	5	0
Lester, Henry	0	5	0
Oakham.			
Wellington, James	0	10	6
Odiham.			
Woodman, George	0	5	0
Oldbury.			
Homes, Joseph P.	0	5	0
Oldham.			
Bagshaw, Henry B.	0	10	6
Bagshaw, William	0	10	6
Bates, Henry	0	10	6
Bates, Hiram	0	5	0
Berry, Thomas	0	5	0
Braddock, George	1	1	0
Brelsford, James	0	10	6
Glover, John S.	0	10	6
Hargraves, H. L.	0	10	6
Haslop, William	0	5	0
Hurst, James	0	5	0
Lord, Robert B.	0	5	0
Wilson, Alexander G.	0	5	0
Olney (Bucks).			
Wright, Mrs. Ann	0	5	0
Ormskirk.			
Garside, S. A.	0	5	0
Oswestry.			
Evans, John	0	5	0
Pierce, R. W. C.	0	5	0
Roberts, William Carey	0	2	6
Smale, Mary E.	0	5	0
Smale, Richard B.	0	5	0
Vaughan, David	0	10	6
Otley (Yorks).			
Pratt, Richard M.	0	10	6
Oundle.			
Roper, Henry E.	0	5	0
Over Darwen.			
Shorrock, R.	0	5	0
Oxford.			
Bloxham, W. E.	0	5	0
Clayton, C.	0	2	6
Court, G. F.	0	5	0
Druce, George C.	0	5	0
Hill, James H.	0	5	0
Houghton, Thomas	0	10	6
How, R. E.	0	5	0
Jenkins, Alexander	0	5	0
Luff, William	0	5	0
Prior, George T.	0	10	6
Squire, James	0	5	0
Thurland, Henry	0	10	6
Walsh, Edward	0	10	6
Wilson, William J.	0	2	6
Padiham.			
Brewerton, Thomas	0	5	0
Paignton.			
Sherriff, George	0	5	0
Paisley.			
McNichol, John	0	5	0
Partick (N.B.).			
Rait, Robert C.	0	10	6
Pau (France).			
Jarvis, John	1	1	0
Paulton (Somerset).			
Bush, Thomas	0	5	0
Pembroke Dock.			
Lane, William	0	5	0

Penarth.	£	s.	d.
John, W. D.	0	5	0
Pendleton.			
Jeans, Thomas R.	0	5	0
Robinson, Benjamin	0	5	0
Penrith.			
Biggs, F. W.	0	2	6
Redfern, Tom	0	10	6
Penzance.			
Buckett, A. H.	0	5	0
Shakerley, Benjamin	0	5	0
Pershore.			
Smith, Arthur W.	0	2	6
Perth.			
Blair, R. P.	0	5	0
Donald, David	0	10	6
Farquhar, James	0	2	6
Peterborough.			
Bloodworth, Thomas	0	2	6
Bodger, J. W.	0	2	6
Bright, Richard H. D.	0	5	0
Carlton, Arthur	0	10	6
Dye, C. P.	0	5	0
Heanley, Marshall	0	10	6
Knight, W. T.	0	9	0
Pearson, John H.	0	5	0
Saunders, J. E.	0	5	0
Sturton, J. R.	0	10	6
Turner, R. P.	0	2	6
Whitwell, Ewen	0	5	0
Willson, Stephen J.	0	10	6
Petersfield.			
Nichols, Frederic B.	0	5	0
Pinner.			
Trist, Richard	0	5	0
Plymouth.			
Adams, W. T.	0	5	0
Allen, Joseph	0	10	6
Bailey, John H.	0	5	0
Balkwill, A. P.	1	1	0
Barge, John	0	5	0
Cocks, James	0	2	6
Foster, F. H.	0	10	6
Goodwin, Medmer	0	10	6
Hearder, H. P.	0	10	6
Hetherington, A. H.	0	5	0
Hill, Richard C.	1	1	0
Luke, R. S.	0	5	0
Martyn, Edwin R.	0	2	6
Maurice, James	0	10	6
Roper, R. F.	0	5	0
Sloggett, Thomas C.	0	5	0
Turney, Samuel B.	0	5	0
Woods, W. H.	0	5	0
Woods, William	0	10	0
Pocklington.			
Boyden, John A. C.	0	2	6
Pontefract.			
Bratley, William	0	5	0
Pontypool.			
Ford, Edward B.	0	10	6
Pontypridd.			
Key, W. H.	1	1	0
Poole.			
Atkins, T. W.	0	5	0
Hamilton, Julius	0	5	0
Penny, William	0	5	0
Pomeroy, F. T.	0	5	0
Port Elizabeth (Cape Colony).			
Walsh, Albert	1	1	0
Willet, John A.	0	5	0
Porth.			
Evans, Mrs. Annie	0	5	0
Porthcawl.			
Thomas, J. J.	0	5	0
Portishead.			
Frowd, Edward F.	0	10	6

Portland.	£	s.	d.
Childs, Joseph L.	0	5	0
Porto Alegre (Brazil).			
Hallawell, Joseph	1	1	0
Portobello.			
Kemp, David	0	10	6
Nesbit, John	1	1	0
Portsea.			
Phillips, Thomas	0	10	6
Portsoy.			
Clark, James	0	2	6
Poulton-le-Fylde (Lancs.).			
Blade, E.	0	5	0
Preston.			
Arkle, C. A.	0	2	6
Carter, James (Bamber Bridge)	0	5	0
Parker, Thomas	0	5	0
Sharples, George	0	5	0
Willan, William	0	5	0
Queenstown (Cape Colony).			
Mager, W. K.	0	10	6
Ramsey (Hunts.).			
Palmer, Frederick W.	0	5	0
Ramsgate.			
Baily, Edward	0	5	0
Franks, Alfred	0	5	0
Gadd, W. F.	0	5	0
Jones, W. S.	0	5	0
Morton, Henry	0	5	0
Saunders, Charles J. H.	0	2	6
Reading.			
Bradley, Charles	0	10	6
Brunsden, Edward	0	2	6
Butler, B. H.	0	5	0
Cardwell, E.	0	10	6
Craft, James	0	2	6
Cross, John	0	2	6
Hayward, William G.	0	5	0
Knowles, J. H.	0	5	0
Loam, J. G.	0	5	0
Powell, J. A.	0	5	0
Rowell, John C.	0	5	0
Tunbridge, Frederick	0	5	0
Young, J. M. (Theale)	0	5	0
Redditch.			
Moule, William	0	5	0
Redhill.			
Foster, Edward M.	1	1	0
Ralling, Ernest L.	0	10	6
Sillitoe, F. S.	1	1	0
Retford.			
Baker, William	0	10	6
Rhyl.			
Davies, Thomas M.	0	5	0
Lawrence, George R.	0	5	0
Rhymney.			
Dixon, Franklin	1	1	0
Roberts, William (Pontlottyn)	0	2	6
Rhuddlan.			
Hughes, Roger	0	5	0
Richmond (Surrey).			
Bletsoe, F. F.	0	10	6
Bletsoe, John	0	10	6
Clarke, Thomas M.	0	10	0
Hornby, Alfred	1	1	0
Mumbray, R. G.	0	10	0
Thacker, William	1	1	0
Richmond (Yorks).			
Thompson, John Thomas	0	10	6
Ripley (Derbyshire).			
Shephard, William A.	0	5	0
Ripon.			
Parkin, J. B.	0	10	6
Thornley, F.	0	5	0
Rochdale			
Bamford, J. W.	0	5	0
Hadfield, James	0	5	0

Rochdale—continued.	£	s.	d.
Highley, William	0	5	0
Kerr, William	0	2	6
Mason, Arthur	0	5	0
Mercer, Thomas W.	0	5	0
Partington, William	0	2	6
Porter, T.	0	5	0
Scott, W. A.	0	5	0
Taylor, Edward	0	5	0
Taylor, John	0	2	6
Whittaker, J. W.	0	2	0
Rochester.			
Hewitt, Joseph S.	0	5	0
Rock Ferry.			
Dutton, John	0	10	6
Roehampton.			
Swain, James	0	5	0
Romford.			
Lasham, John W.	0	10	6
Romsey.			
Blissett, William	0	10	6
Francis, George	0	10	0
Ross.			
Ackrill, George	0	5	0
Rothbury.			
Farrage, Robert	0	10	6
Rotherfield.			
Field, William	0	5	0
Rotherham.			
Bradshaw, C. H.	0	10	6
Rothesay.			
Duncan, William	0	5	0
Macintosh, Archibald	0	5	0
Ruthin.			
Magin, Arthur E.	0	2	6
Rouw, T. J.	0	5	0
Ryde (Isle of Wight).			
Brown, William Henry	0	2	6
Dixon, Henry	0	10	6
Gibbs, William	0	10	6
Pollard, Henry H.	0	10	6
Smith, Tenison	0	10	6
Smith, William	0	2	6
Wallis, George	0	5	0
Rye (Sussex).			
Smith, Alfred W.	0	5	0
Waters, William A.	0	10	6
Saffron Walden.			
Machon, H.	0	15	6
St. Albans.			
Allenby, Henry	0	2	6
Ekins, Arthur E.	0	10	6
St. Andrews.			
Kirk, John J.	0	2	6
St. Bees.			
Broomfield, R. W.	0	10	6
St. Clears.			
Johns, John	0	2	6
Williams, Evan	0	10	6
St. Davids.			
David, Albert	0	2	6
St. Day.			
Corfield, Charles	0	10	6
Corfield, Thomas J. T.	0	10	6
St. Helens.			
Harrison, James	0	5	0
Sherlock, Thomas	0	5	0
St. Just.			
Wearing, John	0	2	6
St. Leonards. See Hastings.			
St. Mary Cray.			
Heath, Thomas	0	5	0

St. Neots.	s.	d.
Mellor, J. G.	0	5	0
Wise, James	0	5	0
Sale.			
Smith, Allen	0	5	0
Salisbury.			
Atkins, Samuel Ralph	1	1	0
Atkins, William R.	0	10	6
Dewing, James E.	0	5	0
Firman, H. B.	0	5	0
Hardy, R. E.	0	5	0
Knapp, Charles R.	0	5	0
Newton, J. W.	0	10	6
Orchard, E. J.	0	10	6
Rowe, J	0	5	0
Saltash.			
Mathew, William H.	0	5	0
Saltburn-by-the-Sea.			
Taylor, William	0	10	6
San Remo (Italy).			
Squire, Frank R.	1	1	0
Sandgate.			
Jenner, William M.	0	5	0
Kennett, Edward	0	2	6
Sandwich.			
Baker, Frank	0	10	6
Dixon, William (Ash)	0	5	
Scarborough.			
Chapman, Henry	0	5	0
Clare and Hunt	1	1	0
Cuttle, Arthur E.	0	2	6
Hill, R. M.	0	2	6
Hughes, John E.	0	10	6
Jones, Alfred	0	5	0
Smith, John F.	0	5	0
Whitfield, John	1	1	0
Seacombe.			
Hinkley, E.	0	2	6
Holt, Richard W.	0	5	0
Seaham Harbour.			
Storey, W.	0	5	0
Seaton.			
Skinner, A. J. P.	0	5	0
Selby.			
Cutting, Thomas John	0	5	0
Selkirk.			
Dunn, Thomas	0	5	0
Settle.			
Shepherd, J. W.	0	10	6
Shanklin (Isle of Wight).			
Brown, Andrew Henry	0	10	0
Deeks, W. T.	0	2	6
Sheepshed.			
Moore, Thomas	0	5	0
Sheerness.			
Hills, William	0	2	6
Prosser, David	0	10	6
Rayner, William	0	5	0
Sheffield.			
Bradwall, J. H.	0	5	0
Carr, George	0	5	0
Clayton, William	0	10	6
Cubley, G. A.	0	10	6
Dobb, J. T.	0	10	6
Dunnill, G. H.	0	5	0
Ellinor, George	0	10	6
Elliott, John G.	1	1	0
Fallding, A.	0	5	0
Fletcher, Howard Bennett	0	10	6
Fox, A. R.	0	10	6
Froggatt and Son	0	5	0
Furness, Joseph M.	0	5	0
Maxey, W. H.	0	5	0
Miller, John T.	0	5	0
Morrison, C. O.	0	5	0
Newsholme, G. T. Wilkinson	1	1	0
Preston, Job	0	10	6
Priestley, Henry	0	10	6
Salisbury, John M.	0	10	6
Ward, William	0	10	6
Watson, H. G.	0	5	0
Watson, Robert W.	0	10	6
Watts, J.	0	5	0
Westbrook, Dr. Charles	1	1	0
Wiles, Edwin	0	5	0

Shepton Mallet.	£	s.	d.
Cottrill, Gilbert Jones	0	5	0
Fudgé, Charles William	0	5	0
Shields, North.			
Burn, Thomas	0	2	6
Corder, Walter S.	0	10	6
Gibson, James	0	10	6
Hogg, Joseph F.	0	2	6
Stobbs, Robert	0	10	6
Shields, South.			
Forrest, Robert	0	10	6
Mays, Robert J. J.	0	10	6
Noble, John	0	5	0
Walker, James	0	2	6
Shifnal.			
Clarke, Thomas E.	0	5	0
Shrewsbury.			
Adams, William	0	5	0
Blunt, T. P.	1	1	0
Cross, A. R.	0	5	0
Cross, William G.	1	1	0
Gouldbourn, William	0	10	6
Longhurst, Edward	0	5	0
Perkins, Christopher	0	5	0
Pyefinch, John	0	5	0
Salter, Joseph B.	1	1	0
Sidcup.			
Gordelier, Frank H.	0	10	6
Sidmouth.			
Chessall, Rowland	0	5	0
Silverdale.			
Wilson, Edward	0	5	0
Sittingbourne.			
Cocking, T. S.	0	5	0
Gordelier, William G.	1	1	0
Sleaford.			
Harrison, T. E.	0	5	0
Slough.			
Elliman, Sons and Co.	1	1	0
Griffith, Richard	0	10	6
Smallthorne.			
Fletcher, Thomas	0	10	6
Snaith.			
Bean, John	0	10	6
Southam.			
Archer, Thomas	0	2	6
Southampton.			
Bishop, Samuel	0	5	0
Borchert, Heinrich T. G.	1	1	0
Dawson, Oliver R.	0	10	6
Fletcher, J. B. (Totton)	0	10	0
Hughes, J. H.	0	5	0
Humby, Lewis W.	0	5	0
Madge, James C.	0	10	6
Mumford, Alfred	0	10	6
Pell, John	0	5	0
Powell, Edward	1	1	0
Randall, William B.	1	1	0
Rubie, J. T.	0	5	0
Spearing, James	0	10	6
Wedge, George D.	0	2	6
Southborough.			
Rogers, Oliver	0	5	0
Southend.			
Dawson, George R.	0	5	0
South Molton.			
Swingburn, Richard H.	0	10	6
South Petherton.			
Wellington, Frederick G. N.	0	5	0
Southport.			
Ashton, William	1	1	0
Ball, Henry	0	5	0
Elliott, Stephen J.	0	2	6
Gillett, Joseph	1	1	0
Hay, David	0	5	0
Horsefall, John	0	10	6
Joy, Joseph	0	5	0
Loadman, James	0	5	0
Mainwaring, R.	0	10	6

Southport—continued.	£	s.	d.
Neame, H. A.	0	2	6
Radley, William V.	0	10	6
Righton, James	0	10	6
Round, Frederick	1	1	0
Surr, Edward	0	10	6
Sykes, Thomas H.	0	10	6
Watson, W. M.	0	2	6
Whitworth, James	0	10	6
Wimpenny, James M.	0	5	0
Southsea.			
Childs, James L.	0	10	6
Cruse, Thomas H.	1	1	0
Futcher, Alfred J.	0	10	6
Lowther, W.	0	10	6
Rogers, Sydney	0	5	0
Rowell, Robert H.	0	10	6
Sangster, John G.	0	5	0
Stephens, N.	0	2	6
South Stockton.			
Ronchetti, T. A.	0	5	0
Southwell.			
Downing, J. H.	0	5	0
Southwold.			
Critten, Robert P.	0	2	6
Sowerby Bridge.			
Stott, William	0	10	6
Spalding.			
Asling, Brelsford	0	5	0
Donington, Robert	0	5	0
Steeper, Samuel	0	5	0
Spennymoor.			
Burden, Thomas A.	0	5	0
Stafford.			
Averill, Henry Alcock	0	10	6
Averill, John	0	10	6
Stalybridge.			
Simpson, Allwood	0	5	0
Stamford.			
Dickinson, Frederick	0	10	6
March, Frederick	0	5	0
March, Richard	0	5	0
Snartt, Frederick M.	0	5	0
Stanford, J. H.	0	5	0
Stevenage.			
Fresson, Lewis Francis	0	10	6
Stockport.			
Hart, Thomas	0	5	0
Johnson, Thomas J.	0	5	0
Kay, Brothers	2	2	0
Sidley, Thomas I.	0	10	6
Towle, Samuel	0	5	0
Stockton-on-Tees.			
Bainbridge, Robert R.	0	2	6
Stoke-on-Trent.			
Adams, Frank	0	10	6
Adams, William H.	0	10	6
Guest, George C.	0	2	6
Harris, Robert H.	0	5	0
Jones, John	0	10	0
Smith, Arthur H.	0	10	6
Wilson, Clement Fisher	0	5	0
Stoke (Surrey).			
Ratheram, William	0	5	0
Stone (Staffs).			
Jenkins, Thomas H.	0	10	6
Slater, Thomas	0	10	6
Slater, Thomas, jun.	0	5	0
Stoneham.			
Sutton, Charles W.	1	1	0
Stonehouse (Devon).			
Maitland and Son	0	5	0
Netten, Henry J. T.	0	5	0
Stony Stratford.			
Cashmore, James F.	0	5	0
Cox, Julia Jane	0	10	6
Robinson, William H.	0	10	6

Stourbridge.	£	s.	d.
Bland, Thomas F.	0	10	6
Burgess, William	0	5	0
Clark, Thomas P.	0	5	0
Hughes, Samuel	0	10	0
Jones, Rowland G.	0	5	0
Loverock, Henry	0	5	0
Perks, Francis	0	10	6
Selleck, W. R.	0	10	6
White, John T.	0	5	0
Stowmarket.			
Gostling, George J.	1	1	0
Simpson, Robert G.	0	5	0
Wilson, Thomas	0	5	0
Stradbroke.			
Foulsham, Harry B.	0	5	0
Stratford-on-Avon.			
Ashfield, Armishaw	0		0
Gaskin, John H.	0	2	6
Stratton.			
Pickard, Henry	0	5	0
Strood.			
Picnot, Charles	1	1	0
Stroud.			
Coley, Samuel J.	0	10	6
Sunderland.			
Aslin, John	0	5	0
Fairman, George P.	0	10	6
Harrison, John	0	10	6
Harrison, W. B.	0	10	0
Leadbetter and Son	0	2	6
Mitchinson, John	0	2	6
Purse, Alfred D.	0	5	0
Ranken, Charles	0	5	0
Sunninghill (Berks).			
Taylor, Thomas E.	0	5	0
Surbiton.			
Acfield, William	0	5	0
Lowe, Charles	0	10	0
Sutton (Cheshire).			
Dangerfield, W. H.	0	5	0
Sutton Coldfield.			
Organ, Edward	0	5	0
Sutton-in-Ashfield.			
Briggs, G. W.	0	5	0
Sutton (Surrey).			
Waugh, Mrs. E.	0	10	6
Swaffham.			
Bell, Frederick R.	0	5	0
Christopherson, Fred	0	5	0
Finch, Jacob	0	10	6
Swansea.			
Atkins, John	0	5	0
Bonnett, Frederick	0	2	6
Davies, J. M.	0	5	0
Davies, John (31, High Street)	0	5	0
Davies, John (75, Oxford Street)	0	2	6
Davies, John (Walters Road)	1	1	0
Davies, William	0	5	0
Evans, D.	0	2	6
George, William	0	10	6
Grose, Nicholas M.	1	1	0
Hughes, James	0	5	0
Jones, Moses	0	10	6
Keall, F. P.	0	10	6
Lloyd, John W.	0	5	0
Lowther, H.	0	5	0
Richards, J.	0	5	0
Roberts, J. K.	0	5	0
Trick, M.	0	5	0
Williams, J. T.	0	10	6
Yorath, C.	0	5	0
Swindon.			
Green, John	0	5	0
Tarporley.			
Aston, Walter	0	5	0
Taunton.			
Burn, B. P.	0	2	6
Copestake, Henry H.	0	5	0
Field, W. C.	0	5	0
Gregory, George H.	0	5	0
Hambly, Charles J.	0	5	0
Kirkpatrick, Mrs.	0	5	0
Redman, Sidney	0	5	0
Sargent, John C.	0	10	6

Tavistock.	£	s.	d.
Doble, H. T.	0	5	0
Gill, William	0	2	6
Teignmouth.			
Cocking, Frederick J.	0	5	0
Cornelius, Joseph	0	5	0
Evans, Joseph J. O.	0	5	0
Pryer, H.	0	5	0
Tenbury.			
Slade, John	0	10	6
Tenby.			
Davies, Moses P.	0	4	0
James, George	0	5	0
Williams, William	0	10	6
Tewkesbury.			
Barlow, G. R.	0	2	6
Wilkes, D. T. (Bredon)	0	2	6
Thame.			
Sutton, W. D.	0	5	0
Thetford.			
Pechey, Thomas P.	0	5	0
Thirsk.			
Ayre, George	0	10	6
Ayre, Harry	0	2	6
Thornhill (N.B.).			
Fingland, James	0	5	0
Thornton Heath.			
Knott, Samuel	0	5	0
Thrapston.			
Pars, R. C.	0	10	6
Ticehurst.			
Corke, Edward	0	10	6
Titchfield.			
Smith, W. O.	1	1	0
Tiverton.			
Havill and Son	0	5	0
Reeves, W. R. (Poole Anthony)	0	10	0
Rossiter, Thomas E.	0	5	0
Tritton, C. E.	0	5	0
Todmorden.			
Stevenson, W.	0	2	6
Topsham.			
Ellis, Frederick	0	2	6
Torquay.			
Bathe, William	0	5	0
Bridgman, William Louis	0	5	0
Cocks, John W.	0	5	0
Guyer, James B.	0	10	6
Horton, Thomas	0	5	0
Knight, Benjamin	0	5	0
Ness, Thomas H.	0	5	0
Riches, Thomas	0	5	0
Shapley, Charles	0	10	0
Sloman, Richard	0	10	6
Smith, Edward	0	10	6
Smith, William	0	2	6
Taylor, John	0	10	6
Totnes.			
Butland, Charles	0	5	0
Cooke, E. H.	0	2	6
Lloyd, Henry	0	2	6
Morse, C. H. Stafford	0	5	0
Tredegar.			
Phillips, Charles L.	0	5	0
Truro.			
Anstey, J. U.	0	5	0
Bucher, W. H.	0	5	0
Feaver, Samuel	0	10	6
James, Hamilton	0	5	0
Newby, Richard I.	0	10	6
Percy, Thomas B.	0	10	6
Tunbridge.			
Gower, Alfred	0	5	0
Millidge, Thomas E.	0	10	6
Wardley, S. F.	0	10	6
Tunbridge Wells.			
Arnold, Spencer	0	10	6
Batting, Thos. G.	0	10	6
Cheverton, George	1	1	0
Dunkley, Edward	0	10	6
Hayllar, J.	0	2	6
Howard, George W.	0	10	6
Howard, Richard	0	10	6
Tunbridge Wells—continued.			
Sells, Robert J.	0	10	6
Whitrow, Benjamin	1	1	0
Williams, James	0	10	6
Tunstall.			
Keightley, Joseph	0	5	0
Tutbury.			
Green, Isaac	0	5	0
Twickenham.			
Alexander, William	0	5	0
Bishop, Thomas	1	1	0
Peake, Henry F.	0	5	0
Shelley, Henry	0	10	6
Twyford.			
Brooker, A. W.	0	5	0
Tynemouth.			
Atkinson, Joseph	0	5	0
Uckfield.			
Salter, Benjamin	1	1	0
Ulverston.			
Kitchin, John	0	5	0
Willan, Robert	0	10	6
Upton-on-Severn.			
Gibbs, John	0	10	6
Urmston.			
Duncalf, Richard	0	5	0
Usk.			
Marsh, G. W. F.	0	10	6
Uttoxeter.			
Jaques, George	0	5	0
Johnson, John B.	0	10	6
Parker, Alfred	0	10	0
Woolrich, Charles B.	0	10	6
Uxbridge.			
Brooks, Thomas	0	5	0
Ventnor (Isle of Wight).			
Littlefield, J. W.	1	1	0
Nicholls, A. L.	0	2	6
Smith, C. A.	1	1	0
Weston, Charles	1	1	0
Wadebridge.			
Philp, J.	0	5	0
Wakefield.			
Cardwell, James	0	5	0
Chaplin, John Lambert	0	10	6
Clarkson, B. F.	0	5	0
Duffin, Thomas	0	10	6
Hudson, Frank	0	5	0
Ibbotson, Fred	0	5	0
Moorhouse, Walter	0	5	0
Pollard, William	0	5	0
Saville, George	0	10	6
Shaw, Mary	0	10	6
Smith, G. E.	0	10	6
Thornton, E.	0	5	0
Wice, J. H.	0	10	6
Winter, William	0	10	6
Wallingford.			
Ashmall, George	0	5	0
Payne, Sidney	1	1	0
Upton, Eustace J.	0	10	6
Wallington.			
Wood, Edward	0	10	6
Wallsend.			
Brand, Roger	0	5	0
Walmer.			
Wood, William Henry	0	5	0
Walsall.			
Elliott, George	0	5	0
Walsham-le-Willows.			
Harrington, Arthur	0	5	0
Waltham.			
Teat, Thomas	0	5	0
Waltham Abbey.			
Griffiths, J. M.	0	10	6
Marshall, A.	1	1	0
Walton-on-Thames.			
Davies, C. E.	0	5	0
Power, William	0	10	0
Wantage.			
Marks, F. C.	0	5	0
Ware.			
Medcalf, Benjamin	0	10	6
Medcalf, Benjamin Pearce	0	10	6
Wareham.			
Harman, E. S.	0	5	0
Randall, Thomas	0	10	6
Warminster.			
Rogers, John M.	0	5	0
Warrington.			
Greenough, H. F.	0	2	6
Young, John R.	0	10	6
Watchet.			
Daymond, Samuel	0	2	6
Watford.			
Chater, Edward M.	1	1	0
Chater, Matthew Taylor	1	1	0
Cottle, Alfred James	0	5	0
Lees, James	0	5	0
Maries, H. D.	0	5	0
Parrott, W. S.	0	10	6
Widdowson, G. W.	0	2	6
Wath-upon-Dearne.			
Hick, Allan	1	1	0
Watton.			
Knight, G. E.	0	5	0
Vincent, Lacey A.	0	10	6
Weaverham.			
Manifold, John J.	0	10	6
Wednesbury.			
Gittoes, Samuel J.	0	10	6
Wellingborough.			
Smith, John T.	0	2	6
Wells (Norfolk).			
Rump, Robert R.	0	10	6
Wells (Somerset).			
Manning, Richard James	0	10	6
Slater, Jonathan	0	5	0
Welshpool.			
Griffiths, Thomas	0	5	0
Welton.			
Myers, George Henry	0	5	0
Welwyn.			
Lawrance, Edmund	0	10	6
West Bromwich.			
Bullus, John	0	5	0
Tunley, John	0	5	0
Westbury-on-Trym.			
Paine, William	0	5	0
Westgate-on-Sea.			
Bessant, Frederick R.	0	10	6
West Malling.			
Stedman, Richard B.	0	5	0
Stedman, Walter	0	2	6
Weston-super-Mare.			
Cooper, John	0	5	0
Duckett, F. W.	0	10	6
Parkes, Harry C.	0	5	0
Wetherby.			
Jackson, John	0	5	0
Weybridge.			
Griffin, Thomas	0	10	6
Weymouth.			
Cole, W. B.	0	5	0
Groves, Thomas B.	0	10	6
Stedman, Samuel S.	0	5	0
Targett, Charles G.	0	5	0
Whitby.			
Corner, Thomas B.	0	10	6
Frank, John	1	1	0
Stevenson, John	0	10	6
Whitehaven.			
Wilson and Kitchin	1	1	0
Wick (N.B.).			
Miller, Kenneth	0	5	0
Wigan.			
Eckersley, M.	0	5	0
Johnson, Thomas	0	10	6
Kellett, Richard E.	0	5	0
Phillips, Jonathan	0	10	6
Worsley, W.	0	5	0

	£	s.	d.
Wilmslow.			
Charnley, Charles	0	10	0
Wimbledon.			
Day, Thomas S.	0	10	6
Dowdeswell, Jonathan	0	5	0
Pooley, John D. S.	0	10	6
Spencer, W. G.	0	5	0
Winchcombe.			
Hall, Alfred L.	0	5	0
Winchester.			
Barratt, F. J.	0	5	0
Bolton. Edgar D.	0	5	0
Knight, George E. Moses	0	5	0
Powell, Edward F.	0	10	6
Windsor.			
Collins, Henry G.	0	5	0
Grisbrook, Edward	0	5	0
Russell, Charles J. L.	0	10	6
Wokes, T. S.	0	2	6
Wood, Robert	0	5	0
Wingate.			
Cross, John T.	0	10	6
Wingham.			
Palmer, Henry B.	0	5	0
Winslow.			
Parrett, Edward	0	5	0
Wisbeach.			
Maxey, John T.	0	5	0
Wishaw.			
Macfarlane, T. B.	0	5	0
Witham.			
Green, Robert P.	0	10	6
Witney.			
Purdue, Thomas	0	5	0
Wokingham.			
Spencer, Thomas	0	10	6
Wolverhampton.			
Cannell, William	0	10	6
Coleman, William	0	10	6
Gibson, F. J.	0	5	0
Hamp, John	0	5	0
Stanway, Edward Thomas	0	10	6
Weaver, Alfred C.	0	10	6
Woodbridge.			
Betts and Son	0	10	6
Worboys.			
Nichols, Arthur F.	0	2	6
Worcester.			
Clower, John	0	5	0
Ferneley, Charles	0	10	6
George, Henry	0	10	6
Hall, Frederick J.	0	5	0
Hinks, John	0	10	6
Horniblow, W. T.	0	5	0
Masters, Charles	0	5	0
Silk, Thomas	0	10	6
Steward, John A.	0	10	6
Twinberrow, John	0	10	6
Virgo, Charles	1	1	0
Workington.			
Mason, Joseph R.	0	5	0
Worksop.			
Baxter, George	0	5	0
Jones, George W.	0	5	0
Worthing.			
Berry, H. J.	0	5	0
Burt, James	0	5	0
Chaplin, Alfred	0	10	6
Cortis, A. B.	0	10	6
Worthing—continued.			
Frost, William	1	1	0
Gulliver, W. I.	0	10	6
Stone, T. W.	0	5	0
Wycombe.			
Wilford, J.	0	5	0
Wyke.			
Drake, William	0	5	0
Wymondham.			
Skoulding, William	0	5	0
Yarm.			
Holt, John	0	5	0
Reed, George	0	10	0
Yarmouth.			
Clows, John E.	0	10	6
Mornement, H. J.	0	5	0
Poll, W. S.	0	2	6
Pratt, Edward J.	0	5	0
Steward, Alfred	0	5	0
Williams, C. E.	0	2	6
Yaxley.			
Farr, Joseph	0	10	6
Yeadon.			
Blatchley, Thomas	0	10	6
York.			
Batty, Thomas	0	10	6
Coates, Henry	0	5	0
Croskell, C.	0	10	6
Parker, Thomas	0	10	6
Saville, John	1	1	0
Sowray, J.	0	5	0
Wand, Thomas	0	5	0
Wisker, R. H.	0	2	6

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Usual 1/6 Cone, in Screw Bottles ...	,,	,,	5/-	,,
Usual 1/6 Cone, in Purple Cases... ...	,,	,,	4/-	,,
Usual 1/- Cones, in Screw Bottles, to Retail at 6d.		,,	4/-	,,
Usual 1/- Cones, in Purple Cases	,,	,,	2/8	,,
Large 6d. Cones, in Screw Bottles	,,	,,	3/6	,,
Large 6d. Cones, in Purple Cases	,,	,,	2/5	,,

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OL. ROSÆ CONCENT.—One ounce of this Concentrated Solution of Anchusine, mixed with two pounds of Oil, will give it the usual colour; it is also admirably adapted for colouring Pomades, Lip Salve, Camphor Balls, &c. 4s. per lb.

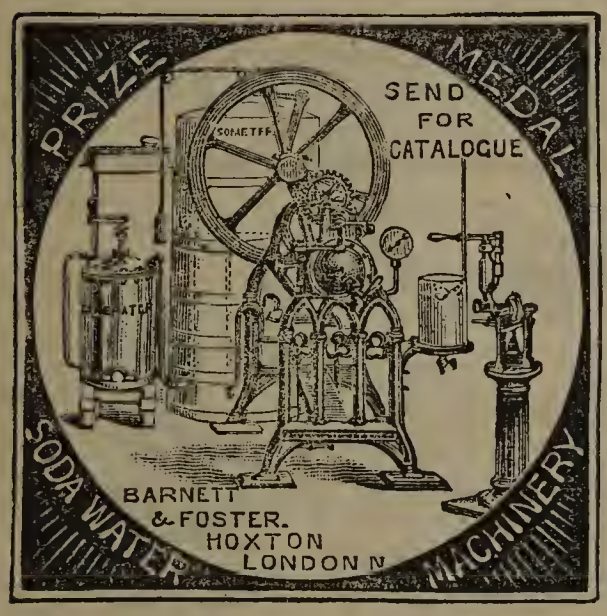
OL. FLAV. CONC.—One ounce, added to two pounds of Pomade, will give the usual golden colour, which is permanent. 4s. per lb.

Sole Proprietors: ***W. BUSH & Co. (late Allchin), Chemists, 180, Barnsbury Rd., London***

TO BE HAD OF ALL THE WHOLESALE HOUSES.

PRIZE MEDALS.—London, 1862, 1873-4. Cape, 1877. Paris, 1867-78. Vienna, 1873. Philadelphia, 1876. Highest Award, Sydney, 1879-80. 4 Medals, Calcutta, 1884.

LATEST AWARDS.—3 GOLD, 2 SILVER, and 2 BRONZE, at the INTERNATIONAL HEALTH EXHIBITION, 1884.



SEND FOR

DESCRIPTIVE

CATALOGUE

(Forwarded

Free)

OF

SODA WATER MACHINERY,

ICE-MAKING MACHINERY,

AND

Accessories,

WITH ALL

LATEST

Improvements,

MANUFACTURED

BY

BARNETT & FOSTER

Mineral Water Engineers, Manufacturing Chemists, and General Providers for the Aerated Water, Wine and Beer Trades.

NIAGARA WORKS,

25n Eagle

Wharf Road,

NEW

NORTH

ROAD,

LONDON, N.

"THE BEST NATURAL APERIENT."

Persistent attempts are made by interested parties to deceive the public by offering Natural Mineral Aperient Waters with marks, names, and designations very similar to those which are used by the **APOLLINARIS COMPANY, LIMITED,** for their **NATURAL MINERAL APERIENT WATER.**

Under these circumstances the **APOLLINARIS COMPANY, LIMITED,** feel compelled to caution the public that the **HUNGARIAN BITTER WATER** (Hunyadi Janos) sold by the **COMPANY** always bears the name of the **APOLLINARIS COMPANY, LIMITED,** on the Label.

Woodhall Spa.

BROMO IODINE MINERAL WATER.

The strongest known Mineral Water in the world. This remarkable Spa has been purchased by a syndicate of gentlemen, who have determined to make more widely known the extraordinary curative powers of this Spring, which contains more Iodine and Bromine than any Spring in Europe. An analysis of the water having been made in November, 1886, by Professor Wanklyn, M.R.C.S., corresponding member of the Royal Bavarian Academy of Sciences, Professor of Chemistry, a very important discovery has been made—viz., the presence of Free or Elementary Iodine.

Dr. WANKLYN says:—"So far as I am aware, this is the first instance in which free iodine has been found in appreciable quantity in a natural water. For many years the Woodhall Spa has been celebrated as a valuable remedy in skin diseases. The fact that it is a solution of free iodine is interesting in this connection, and well worthy of the attention of the medical profession."

The Woodhall Bromo Iodine Water is now being bottled at the Spring by the Sole Agents, BROMLEY & CO., Chemists, 233, High Street, Lincoln, 5 and 6, The Grove, Buxton, and Woodhall. All communications to be addressed to them at the Spa, Woodhall, Horncastle.

NATURAL MINERAL WATERS OF BUSSANG

(VOSGES.)

HIGHLY TONIC AND RESTORATIVE.

Bicarbonated, Alkaline, containing Salts of Iron, Manganese, Arsenic, and Lithia, intimately combined with Carbonic Acid Gas.

A sovereign remedy in Chlorosis Anæmia, Gastralogy, Dyspepsia, Chronic Diarrhœa, Vesical Catarrh, Renal Colic, Gravel, and Gout. Its "Anti Lithique" action is demonstrated by the fact that it reduced to a fine powder a calculus which had been submerged in it for a month, and instead of producing the debilitating effects of purely alkaline water, it has the inestimable virtue of entirely eliminating the uric acid and fortifying the stomach.

It is a valuable adjunct in the treatment of Bright's Disease, Diabetes, and noted in all cases of convalescence, and as a preservative from epidemic and infectious maladies.

F. E. STURMFELS, 25, COLEMAN STREET, LONDON, E.C.

By Royal Letters Patent.

HASSALL & CO.'S PHOSPHO-CITRIC ACID.

To Supersede Citric and Tartaric for Aerated Waters. It is recommended by the most eminent Physicians in Great Britain.

THE BEST HOUSES IN THE TRADE HAVE ALREADY ADOPTED IT.

It is thoroughly beneficial, and far better suited to the requirements of the Mineral Water Trade; it is free from lead and all other minerals and cheap acids; it is fully £8 per cwt. cheaper than Citric Acid, which mostly contains lead.

WE COMPETE ON QUALITY AND PRICE.

Testimonial from Mr. A. J. MASON, Chemist, of Bexley Heath.—"Having gone carefully into the matter, I have no hesitation in saying that the patentees have in no way overstated the merits of their acid. There is no doubt in my mind that Phospho-citric Acid produces a much higher class beverage—giving, as they say, 'greater body'—the one thing needful in this class of goods; also a fruity character and mellowness I have never been able to secure with the ordinary acids. The aroma is also more pronounced. 'Purity' was my great incentive to giving the acid a trial, but I found 50s. or 60s. (citric at 1s. 7d. per lb.) per cwt. an economy not often secured under such favourable circumstances."

Why pay 2/6 per lb. for Citric, when a purer and more efficient Acid can be bought at about ⅓ the price?

Beware of Imitations.

Write for Pamphlet and Testimonials. 3-oz. Sample will be sent on receipt of Postage (3 Stamps), or 14 lbs. on approbation.

HASSALL & CO., Great Northern Goods Depot, King's Cross, LONDON.

REUTER'S CABLES AND INLAND TELEGRAMS—"REMPUJARON LONDON."

MAWSON'S FILTERS

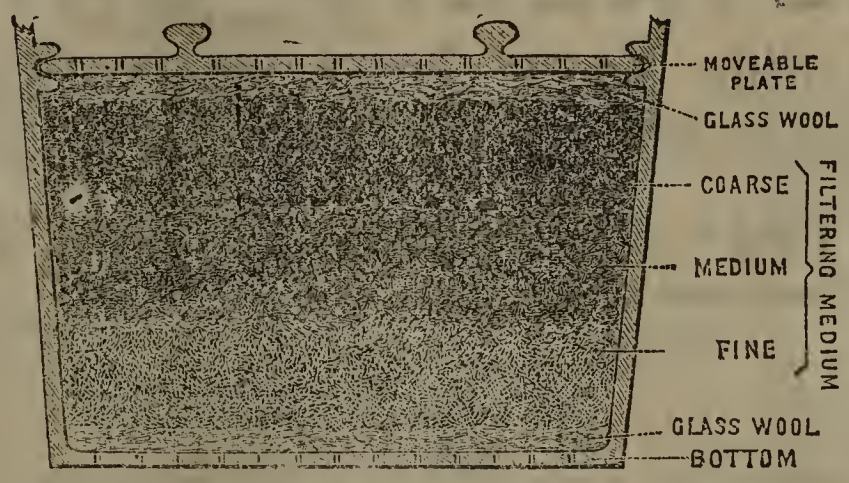
Proven by Analysis to remove Lead, Lime in excess, Sewage and Bacteria.

SECTION

OF

FILTER BED

(EARTHENWARE).



PROPRIETORS AND MANUFACTURERS—

Mawson, Swan & Weddell, Newcastle-on-Tyne.

WHOLESALE AGENTS:—

London.—Maw, Son & Thompson; Bentley & Son; Bourne, Johnson & Latimer; Lynch & Co.; Toogood & Son, **Liverpool.**—Symes & Co.; Evans, Sons & Co.; J. H. & S. Johnson. **Manchester.**—Woolley, Sons & Co. **Birmingham.**—Southall Bros. & Barclay. **Bristol.**—Ferris & Co. **Edinburgh.**—Duncan, Flockhart & Co.; Raimes & Co. **Glasgow.**—Glasgow Apothecaries' Company. **Belfast.**—Grattan & Co. **Cork.**—Goulding, Bannister & Co., Limited.

COLONIAL AND FOREIGN. Bombay.—Kemp & Co., Limited. **Calcutta.**—Smith, Stanistreet & Co. **The Cape.**—B. G. Lennon & Co., Cape Town, Port Elizabeth, and East London. **Natal.**—E. S. T. Stantial, Pietermaritzburg. **Hong-Kong.**—Watson & Co., Limited. **New Zealand.**—Kempthorne, Prosser & Co., Dunedin, Christchurch, Wellington and Auckland. **Spain.**—José Bowron, Murcia. **Denmark.**—Leopold Gyth, Copenhagen, &c., &c.

SPECIAL NOTICE.

INGRAM & ROYLE

Have the pleasure to announce to the Trade that they have been appointed

SOLE AGENTS

FOR THE

CARLSBAD SALTS

AND

WATERS.

Full details will be forwarded shortly per circular.

BETTS & CO. LIMITED

(ESTABLISHED IN 1840),

SOLE MAKERS IN GREAT BRITAIN OF

METALLIC CAPSULES,

AND PATENTEES OF THE

Coloured Side Mark, Label, and other Speciality Capsules

(For the Prevention of Fraud and Refilling of Old Labelled Bottles)

As supplied to Bass & Co., Hennessy & Martell, Cognac, and the leading Brewers and Bottlers of Wines and Spirits throughout Europe.

PLAIN ORDINARY CAPSULES,

For Small Phials, **2s. 6d.** and upwards per 1000, according to size, style, design, and quantity.

SPECIAL CONTRACTS FOR CONTINUOUS DEALING.

MANUFACTURERS OF

PURE ENGLISH MADE BOTTLING AND PACKAGE TINFOIL

From **1s.** per lb., and upwards. **MIXED FOIL** (Foreign Quality), from **6d.** per lb. (according to gauge).

PATENT BARREL PACKAGES AND SNUFF CANISTERS, TEA PACKAGES, &c.

COLLAPSIBLE TUBES AND SPRINKLERS

FOR PERFUMERS AND OTHERS.

MANUFACTORIES:

LONDON:—Chief Office and Factories, Wharf Road, City Road, E.C.; and Holloway and Batavia Mills, Holloway, N.W.
BIRMINGHAM:—Moor Green Fields.
PARIS:—Office, 65, Rue Verrerie.
BOURDEAUX:—Office, 3, Quai de Chartrons; Factory, Monrepos, Floirac.

PATENTEES OF

Hydraulic and Mechanical Pressure Capsuling Machines,

ESPECIALLY ADAPTED FOR CHEMISTS' COUNTERS,

Largely in use by the Trade, and efficiency guaranteed for all sizes of Bottles. at Royalties from **5s.** to **£2 2s.** per annum.

DR. MICHAELIS'
TONIC COCOA.

Made from pure Cocoa of the finest quality, combined with a soluble extract of acorns, and free from Cellulose.

Recommended expressly for Catarrhal Affections of the Digestive Organs, also for Chronic and Infantile Diarrhœa. A Tonic, Nutritious, and Digestive daily beverage for children and persons of all ages, and especially useful in convalesence and for persons suffering from debility.

"Has a pleasant flavour like chocolate, never palls upon the palate; rapidly improves the condition of the children in cases of diarrhœa and their state of nutrition. In extensive use in Germany as a beverage both for children and for adults."—*British Medical Journal*, July 31st, 1886.

Manufactured only by

STOLLWERCK BROS.
COLOGNE.

Sole Agents for Great Britain:

KÜHNER HENDSCHEL & CO.
145, CANNON STREET, LONDON, E.C.

☞ *Samples for trial will be forwarded on application to Medical Men and Public Institutions.*

IMPORTANT NOTICE.

TO CHEMISTS AND DRUGGISTS.

Any Wholesale or Retail Chemist who publishes a Monthly or Annual List of Prices for the use of the general public, or Pocket Almanack, will oblige Messrs. A. Rowland & Sons, of 20, Hatton Garden, London, by sending them a copy of the last issue and stating price of advertisement to occupy page or half page facing matter, or on outside back cover. Counter Bills can always be had

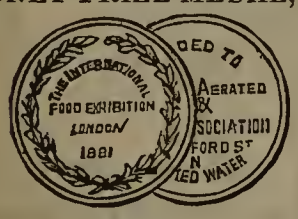
ON APPLICATION.

In order to comply with a wish expressed by many of their customers, Messrs. A. Rowland & Sons beg to announce to Chemists and Druggists that in future they will be able to supply their

ROWLANDS' KALYDOR

for the skin and complexion in bottles of half the usual 4s. 6d. size, viz., at 2s. 3d.; this 2s. 3d. size is not intended to interfere with the sale of the 4s. 6d. and 8s. 6d. sized bottles, but is only put up in order to suit the wishes of those who may prefer a smaller sized bottle.

ONLY PRIZE MEDAL,



LONDON, 1881.

THE CHEMISTS'

HIGHEST PRIZE MEDAL,

BRADFORD, 1882.

Aerated & Mineral Waters Association, Ld.

THE Company was registered in 1878, and it is pleasing to note the gradual but ever increasing number of new Members who join year by year, naturally bringing increased trade and prosperity to the Association.

The following figures and facts will be interesting to the Members of the Association :—

Year.		No. of Members.		Dividend.
September 30th, 1878	..	119	..	None
,, 1879	..	350	..	None
,, 1880	..	430	..	None
,, 1881	..	540	..	None
,, 1882	..	615	..	3¾
,, 1883	..	708	..	5
,, 1884	..	908	..	6
,, 1885	..	1,193	..	6
,, 1886	..	1,463	..	6

The results of the Working for this period were as follows : 1879 being the first complete working year :—

			£	s.	d.
1879	.. ..	Loss	260	13	8
1880	.. ..	Profit	275	0	1
1881	.. ..	,,	729	5	3
1882	.. ..	,,	904	18	0
1883	.. ..	,,	1,307	2	10
1884	.. ..	,,	1,919	0	4
1885	.. ..	,,	1,844	10	7
1886	.. ..	,,	2,170	14	0

It may be thought that the year 1885 shows a falling-off in results, but that is not really the case, as in this year we tried the experiment of free delivery in London, which cost us about £600. We are now charging a small amount for delivery in town.

By referring to balance-sheet for this year you will find that £438 16s. 7d. had to be deducted for Harrogate law expenses, otherwise the profit would have shown a much larger increase over that of 1885.

It is hardly necessary to dilate here on the really wonderful progress made by the Association, nor on the superior quality and excellence of the waters manufactured. A glance at our testimonials will show how thoroughly satisfied the Members are on all these points. We would, however, volunteer our opinion that the Association (notwithstanding that at the commencement it was very tardily supported by the trade) will year by year increase, and that eventually we shall have the general support of the Chemists of the United Kingdom.

LONDON. HARROGATE. BRISTOL.

CHANGE OF ADDRESS.

THOMAS CHRISTY & CO.

BEG to notify that, on and after March 1st next, their Business will be conducted from their new Offices and Warehouses, 25, LIME STREET, E.C., 1st Floor, where every arrangement has been made for the prompt delivery of all NEW and RARE DRUGS; FLUID EXTRACTS; LOZENGES; MENTHOL CRYSTALS; MENTHOL CONES and INHALERS; MYOCOM FLY GUM; MISTOLE; KERPOD, etc.

PRICES BEYOND COMPETITION. SPECIAL CONTRACTS MADE TO REGULAR BUYERS OF MENTHOL CONES. APPLY FOR NEW PRICE LISTS, JUST ISSUED.

POSTAL ADDRESS, 25, LIME STREET, LONDON, E.C. TELEGRAPHIC ADDRESS, CHRISTYFEN, LONDON
TELEPHONE No. 4247.

FARMER'S 504 TONIC,

THE GREAT NERVE RESTORER,

ENTIRELY FREE FROM QUININE,

FOR THE IMMEDIATE CURE OF

TIC OR NEURALGIA, WEAKNESS, NERVOUS DEPRESSION, LASSITUDE, INDIGESTION AND WANT OF APPETITE.

In Bottles, 1/9, 2/9 and 4/6. Free by Post, 2/-, 3/3 and 5/-.

Sold by all Respectable Chemists.

REGISTERED. REGISTERED.

Wholesale—Messrs. BARCLAY & SONS, NEWBERY & SONS, SANGER & SONS

AND THE

Proprietor, A. C. FARMER, Chemist, Southborough, Tunbridge Wells.

IMPORTANT TESTIMONIALS.

Mr. FARMER,

Sir,—In accordance with your request, I have tried your Tonic, now known as the 504 Tonic, for cases of Neuralgia, and have found it efficacious. From the nature of the ingredents, of which you kindly informed me, I should say it was likely to be beneficial in the class of cases to which you refer, viz., Anæmia, Chlorosis, Tic Doloreaux, and Chorea.

I am, yours faithfully,

17, PARK ROAD, SOUTHBOROUGH.
24th January, 1887. E. PAGET THURSTAN, M.D., B.A., M.R.C.S., L.S.A.

FORGE STREET, SOUTHBOROUGH.

Dear Sir,—I am thankful to inform you that my daughter, who has been suffering from St. Vitus's Dance, and had lost the entire use of her legs and arms for many months, has quite recovered since she has taken your "504 Tonic," and now enjoys the best of health.

I am, yours gratefully, CATHERINE BUTTON.

HUNT'S BOTTLE CAPS (Pleated Paper),

From 8d. per gross, of all the WHOLESALE HOUSES.

Manufacturers—W. F. HUNT & CO., 6, 8 and 10, LEXINGTON STREET, LONDON, W.

USED IN THE ROYAL NURSERIES.]

MATTHEWS'S

PREPARED FULLERS' EARTH

Is superior to all other kinds for Protecting the Skin and Preserving the Complexion from Cold Winds, Redness, Roughness, &c.

ROUSE & CO., 12, WIGMORE STREET, LONDON.

[USED IN THE ROYAL NURSERIES

TWENTY-NINE PRIZE GOLD AND OTHER MEDALS, DIPLOMAS, &c., AWARDED

AT THE VARIOUS INTERNATIONAL EXHIBITIONS HELD THROUGHOUT THE WORLD.

By Royal Appointment.

CRYSTAL PALACE BOND'S GOLD MEDAL MARKING INK

PREPARED BY THE DAUGHTER OF THE LATE JOHN BOND

REGISTERED TRADE MARK.

Purveyors to the Crown Agents for the Colonies.

"Larger Sale than all other Makes combined."

WHOLESALE PRICES NETT.
6d. 30/- per gross.

1/- 60/- per gross.

FACSIMILE of the GENUINE LABEL.

Crystal Palace Bond's (Daughter's) Ink.

All Inks displayed to the very best advantage on very attractive Embossed Gold Show Cards, or in desk-shape Counter Boxes.

Please carefully compare Labels and Prices.

WHOLESALE PRICES NETT.
6d. 24/- per gross.

24/- per gross Nett. 48/- per gross Nett.

FACSIMILE of the JOHN BOND & CO. LABEL.

Note above Low Quotations.

QUALITY OF INK GUARANTEED.

MOUNTED ON A VERY ATTRACTIVE SHOWCARD OF ONE DOZEN.

In Bottles at 6d. and 1s., or Large Family Bottle (twice the size of an ordinary shilling bottle); Glass Stoppered, with Glass Pen specially made for the purpose, 1s. 6d. Marking Ink Cabinets, consisting of Large Bottle of Marking Ink, Improved Linen Stretcher, Penholder and Quill Pens, in Handsome Box, 1s. 6d. Family Bottle, Stoppered, in Boxwood Case, 2s. 6d. each. Large Stoppered Bottles, in Boxwood Cases, for the use of Large Establishments, to retail, 2s. 6d. each

WHAT THE WHOLESALE SAY.

From JOHN SANGER & SONS, 489, Oxford St., W.
To Mr. J. HICKISSON, 75, Southgate Road.

Dear Sir,—In reply to your letter we beg to state that the sale of your "Crystal Palace Bond's Gold Medal Marking Ink" is found by us to exceed that of all other makes combined. Yours truly,

JOHN SANGER & SONS.

From LYNCH & Co., Aldersgate St., London, E.C.
To Mr. J. HICKISSON, 75, Southgate Road.

Dear Sir,—We have pleasure in saying that, as far as our experience goes, your Marking Ink commands by far the largest sale of any. Our orders for "Crystal Palace" Marking Ink greatly exceeding that of all the other makes which we stock. We are, dear Sir,

Yours faithfully, LYNCH & CO.

From FRANCIS NEWBERY & SONS,
1, King Edward St., Newgate St., London, E.C.
To Mr. J. HICKISSON, 75, Southgate Road.

Dear Sir,—In answer to your favour we are pleased to be able to say that the demand for your "Crystal Palace Bond's Gold Medal Marking Ink" still maintains a high rate, our sales thereof continuing greatly in excess of those for other makes. We hope our orders may go on increasing. We are, dear Sir,

Yours faithfully, F. NEWBERY & SONS.

From W. HAWTIN, SON & COOK,
24 & 25, Paternoster Row, and 18a, Paternoster Sq.,
London, E.C
To Mr. J. HICKISSON.

Dear Sir,—We have much pleasure in stating that our sales of your "Crystal Palace Bond's Gold Medal Marking Ink" during 1886, have been considerably in excess of previous years. We notice that our purchases of your Marking Ink greatly exceed the total of our orders to all other makers put together, and we are therefore pleased to add our tribute to the high excellence and quality of your productions.

Faithfully yours,

W. HAWTIN, SON & COOK.

From W. SUTTON & Co.,
10, Bow Church Yard, London, E.C.

To Mr. J. HICKISSON.

Dear Sir,—In reply to your favour to hand this morning, we can confidently say that the "Crystal Palace Bond's Gold Medal Marking Ink" has the largest sale of any Marking Ink with us.

Yours respectfully,

W. SUTTON & CO.

CAUTION! In ordering from the Wholesale, please state Crystal Palace Bond's (Daughter's) Ink is required, and kindly examine each parcel received, as complaints are daily made of colourable imitations being substituted.

Please send for New Illustrated Price List. Framed Show Cards and Handbills free on application.

WORKS: 75 SOUTHGATE ROAD, LONDON, ENGLAND.

New Improvement—Guaranteed not to dry up in the bottle; return if not as we state.

New Improvement—Guaranteed to remain fluid in any climate; if not as we state, return.

FREEMAN'S CHLORODYNE

THE ORIGINAL AND ONLY TRUE

IT IS THE GREATEST MEDICAL DISCOVERY OF THE PRESENT CENTURY, AND IS REGARDED AS A BOON TO MANKIND.

It is the best known remedy for COUGHS, COLDS, CONSUMPTION, WHOOPING COUGH, BRONCHITIS, and ASTHMA.

It effectually checks and arrests those too often fatal Diseases —DIPHTHERIA, DIABETES, FEVER, CROUP, AGUE, &c.

It acts like a charm in DIARRHŒA, and is the only known specific in CHOLERA and DYSENTERY.

It effectually cuts short all attacks of EPILEPSY, HYSTERIA, PALPITATION, CONVULSIONS and SPASMS.

It is the only Palliative in RHEUMATISM, GOUT, CANCER, TOOTHACHE, NEURALGIA, SCIATICA, LUMBAGO, &c.

It rapidly relieves pain from whatever cause, allays the irritation of Fever, soothes and strengthens the system under exhaustive diseases, restores the deranged functions, stimulates healthy action of the secretions of the body, gives quiet and refreshing sleep, and marvellously prolongs life. It may be taken by old and young at all hours and times, according to the Directions.

It is extensively used by Medical Men in their official and private practice, at home and abroad, who have given numerous written testimonials of its wonderful efficacy.

SPECIMEN TESTIMONIALS.

From JOHN TANNER, M.D., L.R.C.P., M.R.C.S., L.S.A., L.M., *Physician to Farringdon Dispensary, London; Physician to the Rev. C. H. Spurgeon's Metropolitan College, &c.*

102, HARLEY STREET, CAVENDISH SQUARE, W.

"It gives me great pleasure to bear testimony in favour of FREEMAN'S Chlorodyne. I have prescribed it extensively, and in cases of Asthma, Chronic Bronchitis, the last stage of Phthisis, and the Winter Cough of the aged, I have never found any substitute or chemical combination its equal."

From J. DODD SWALLOW, M.D., M.R.C.S., Eng.; L.A.S.; *Medical Officer to the London City Missions, &c., &c.*

213, CLAPHAM ROAD, LONDON, S.W.

"I have great pleasure in stating that I am constantly prescribing FREEMAN'S Chlorodyne. In Consumption and Asthma, as a Sedative; in Cancer, and in cases of Diarrhœa and Dysentery, I am daily witnessing its striking effects, and believe that the thanks of the profession are due to Mr. FREEMAN for his efforts to bring prominently before the profession so valuable and *reliable* a remedy as the Chlorodyne which bears his name."

264, PETIT SACONNEX, GENEVA, SWITZERLAND, *January 6th*, 1886.

Dear Sir,—I send by same post £1 16s., or 46 francs, for 8 bottles, value 4s. 6d. each. Your Chlorodyne has been used in a case of Cancer, notorious at St. Leonards-on-Sea, where Dr. Penhall and Dr. Harvey attended, and the case was given up as incurable, for the leg ought to have been cut off, and the patient was too weak to stand operation. Now, Dr. Metcalfe said the same thing, and your Chlorodyne cured the person, which indeed is my servant, after six years, being still alive and perfectly well. I think it is due to you, as the Inventor of the remedy, to state the fact, that others in similar circumstances may never despair, as long as life is in the body. I authorise you to use my letter as you may think best, and also my name, to prevent people being humbugged by other rubbish. &c.

To Mr. RICHARD FREEMAN. Yours truly, WALTER SAVAGE LANDOR.

Sold by Chemists and Patent Medicine Dealers all over the world, in bottles, 1s. 1½d.; 2 oz., 2s. 9d.; 4 oz., 4s. 6d.; half-pints, 11s.; and pints, 20s. each; and by the Inventor, RICHARD FREEMAN, 70, Kennington Park Road, London, S.E.

Purchasers are cautioned not to have palmed upon them any substitute. See that the Trade Mark, "The Elephant," is on the wrapper, &c., and that the words FREEMAN'S ORIGINAL CHLORODYNE *are engraved on the Government Stamp, which is the only true Chlorodyne.*

N.B.—Lord Chancellor Selborne, Lord Justice James, and Lord Justice Mellish decided in favour of FREEMAN'S ORIGINAL CHLORODYNE, and against Brown and Davenport, compelling them to pay all costs in the suits. See *Times* of July 24, 1873.

ONE MILLION PENCILS SOLD IN TWO YEARS.

HARVEY'S { "WORLD FAMED" TOOTHACHE PENCILS. / THE ONLY AND ORIGINAL "TOOTHACHE PENCIL." / THE LONDON CORN AND WART PENCIL. / THE MOST PERFECT AND SALEABLE ARTICLE IN THE TRADE. } **PENCILS**

"Toothache Pencil" being a Registered Trade Mark (No. 15048), we shall take immediate proceedings against any one infringing our rights. *Sold by every Chemist and Druggist throughout the World.*

MENTHOL CONES.

ACMÉ BRAND (REGISTERED No. 38537.)

Guaranteed Pure Japan Menthol. The cheapest and best put up Cones in the Market.

No.		Per dozen.
92.	Nickel Screw Capped Bottles	2/6
90.	,, ,, ,, ,,	3/8
89.	,, ,, ,, ,,	4/6
88.	Hard Wood Boxes, Pedestal Shape	2/6
*163.	Vegetable Ivory, Acorn Shape	5/
*162.	Boxwood Boxes, Pedestal Shape	3/11
*161.	,, ,, Acorn Shape	4/2
*202.	,, ,, Bullet ,,	3/11
*203.	,, ,, Cone ,,	3/11
*201.	,, ,, Barrel ,,	3/11
*200.	,, ,, Pedestal ,,	3/
215.	Menthol Smelling Bottle in attractive Show Case	4/

No.		Per dozen.
205.	Boxwood Boxes, Pedestal Shape, each in box	3/3
*204.	Vegetable Ivory, Castle Shape	5/10
*206.	Boxwood Boxes, No. 203, Large size	4/8
*207.	,, ,, Draughtsman Shape	4/11
*208.	Vegetable Ivory ,, ,,	6/6
*210.	Boxwood Boxes, Acorns, Nickel Plated Caps	5/4
*211.	Vegetable Ivory Boxes, Acorns, Nickel Plated Caps	5/10
212.	Boxwood Boxes, Bullet Shape, Reversible End	4/8
213.	Menthol Charms for Watch Chain, &c.	2/8
214.	Glass Show Bottles, with Cone on Stopper	6/6

209.—NICKEL PLATED PENCIL, WITH MENTHOL AT END, 1s. size, 4s. 3d. per doz.

A Sample Box containing one each of above, 5/; by post, 5/3.

Cones marked thus (*) are in glass fronted hanging Boxes.

Cones supplied loose at lowest prices. Five per Cent. Discount for Cash with Order.

Special Quotations for large Quantities. Manufactured only by

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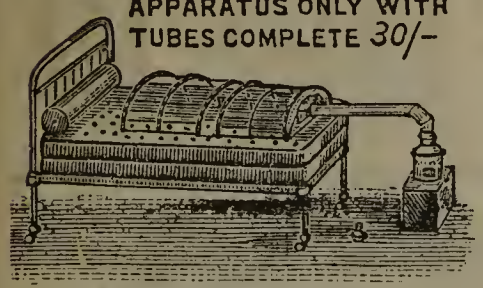

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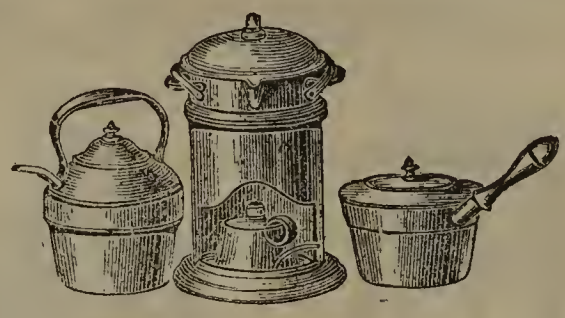

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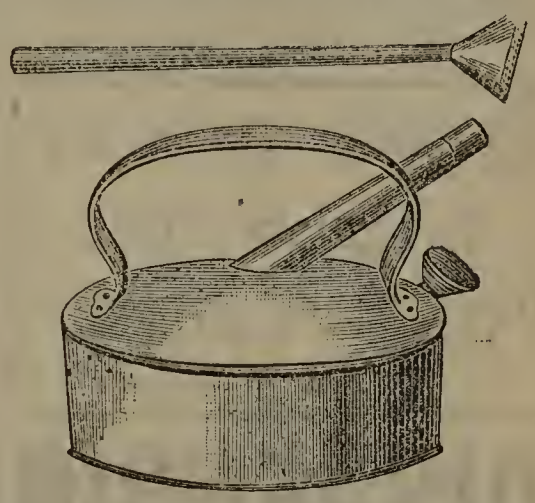

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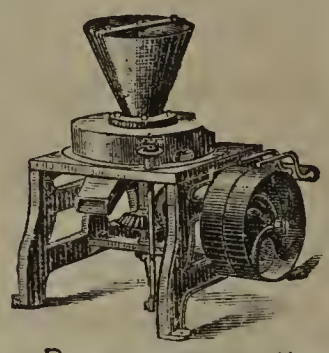
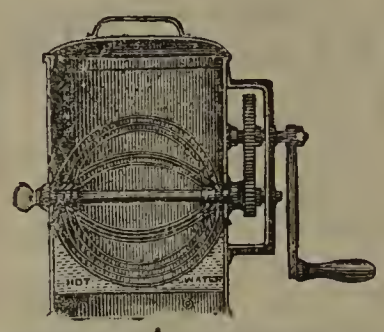

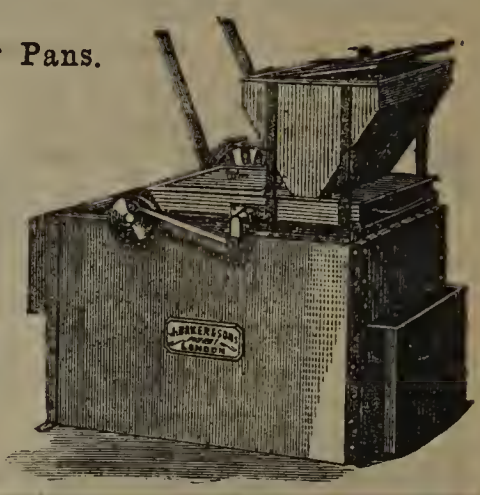

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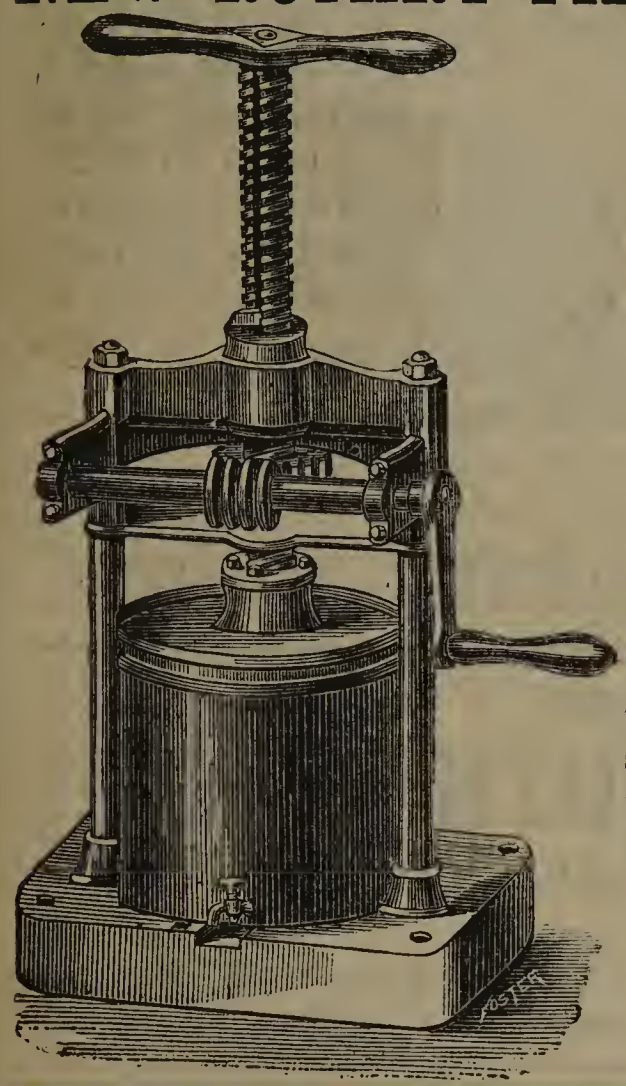

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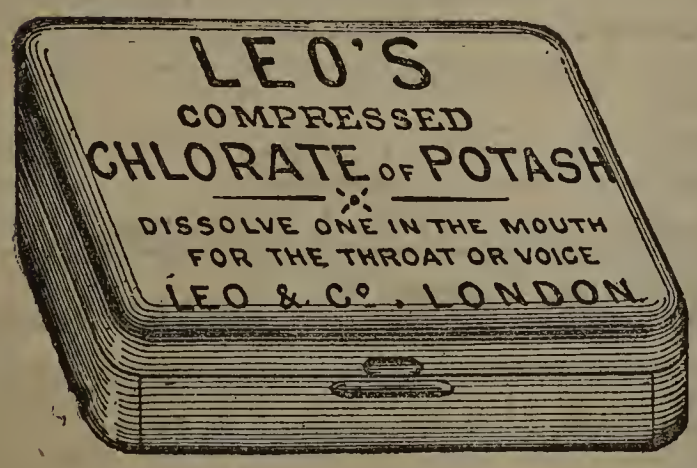

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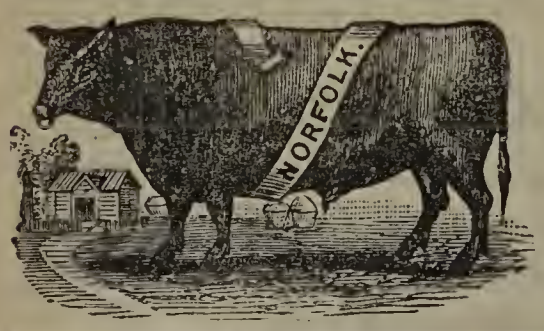

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Disinfecting Fluid; "Crude Sanitas;" Oil; Emulsion; Insecticide; Sheep Dip; Powder; Hard, Soft, Brown Windsor, Toilet and Animal Soaps; Soap Powder; "Sanitas Jelly;" Veterinary Ointment; Tooth Powder; Toilet Powder; Toilet Fluid; Furniture Cream; Antiseptic Gauze; Fumigators. **GOLD MEDALS, CALCUTTA, 1883-4, and PARIS, 1885.**

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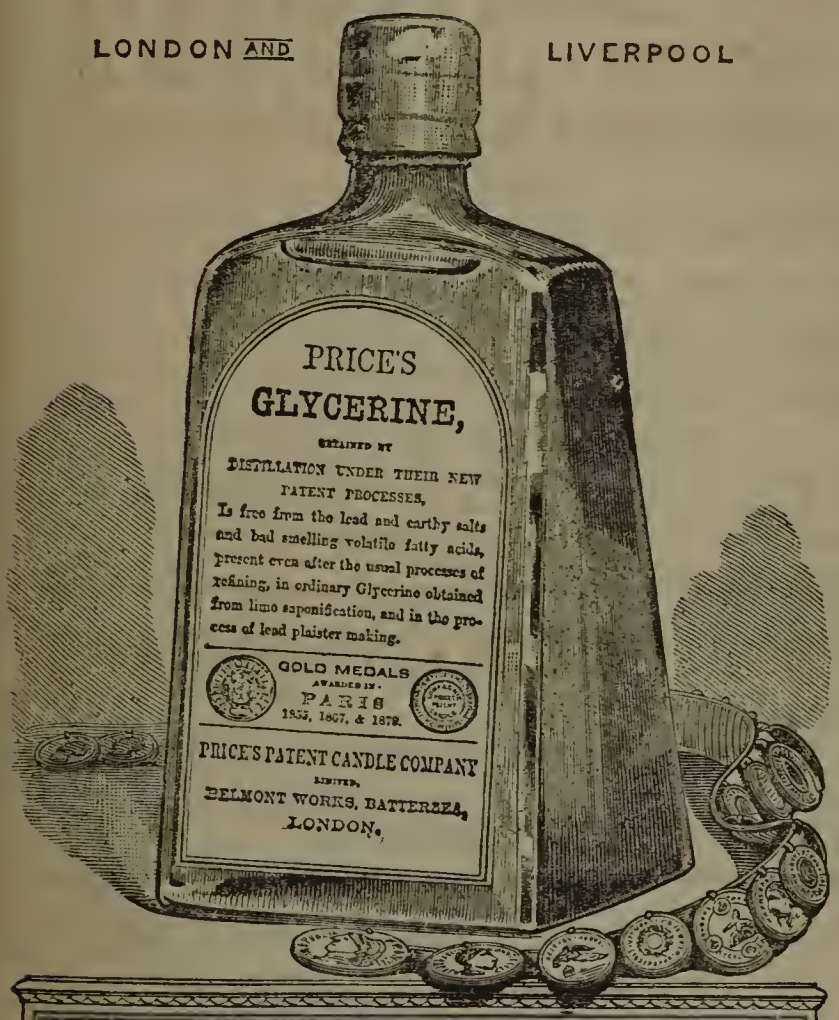

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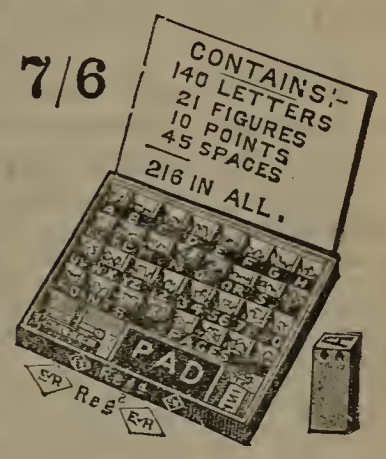

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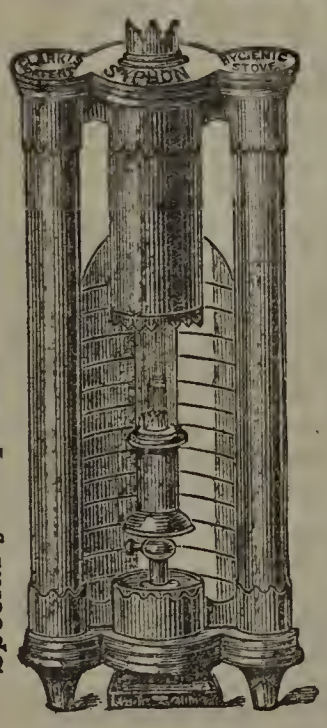

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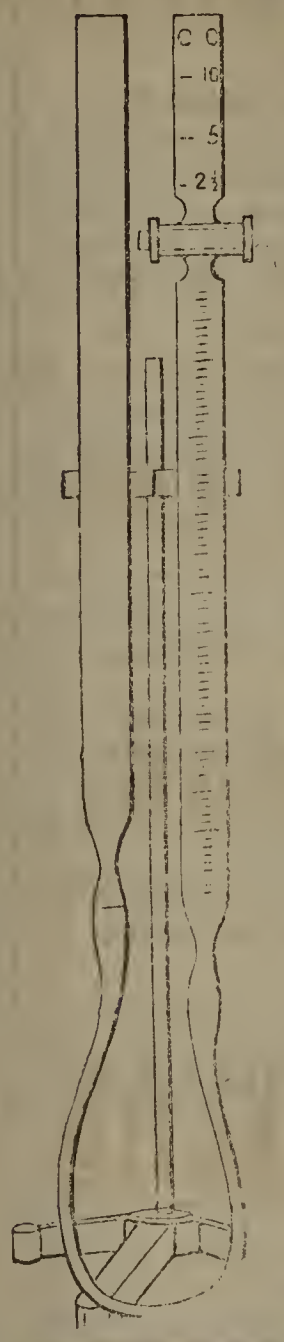

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Clip, Wood Stand and Nitrometer, complete	12/6
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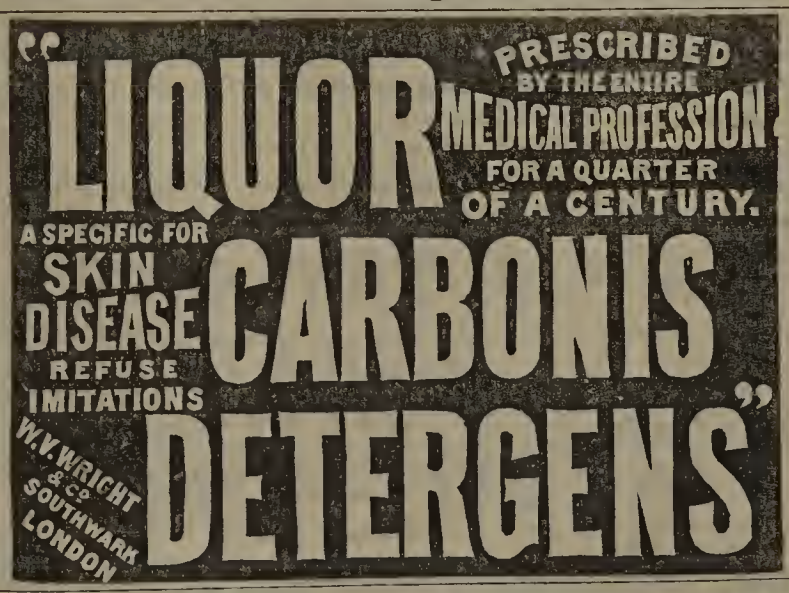

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The most efficacious antacid and mild aperient for delicate constitutions, ladies, children and infants.
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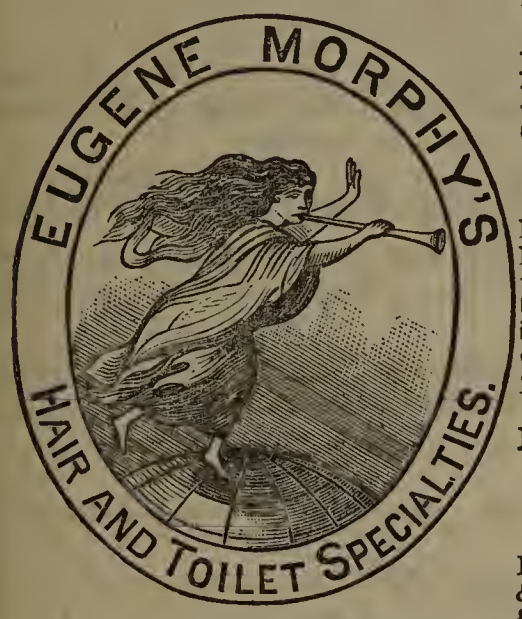

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ACTIVE, reliable ASSISTANT. Must be over 24 years of age. Qualified and experienced in good class business. Married preferred. Salary good, and opportunities for advancement to capable man. Apply, stating age, height, qualification, previous engagements, references, &c., and enclosing carte (to be returned), to CHEMIST, 67, Derby Road, Southampton.

ASSISTANT, about 22 years of age, to manage a small Branch in a Northern suburb of London. Must be accustomed to suburban business. Time for reading. Address B., care of Messrs. Herring & Co., 40, Aldersgate St., London, E.C.

BUSINESSES FOR DISPOSAL.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

N.B.—Postage Stamps cannot be received in payment.

GENUINE Mixed BUSINESS (Branch), near Birmingham. Chiefly profitable light Retail. Populous neighbourhood. Large corner shop, handsomely fitted. Rent £40. Good house; private entrance. January returns £45 12s. 6d. Valuation only, about £250. No goodwill. Good Prescriber with personal attention would realise fortune. Apply, 139, Monument Rd., Birmingham.

BY a young man a PARTNER, either sleeping or active; if the latter, preference will be given to a young man, to extend a Wholesale Retail attached, with a good increasing connexion. About £200 required. Address, ENERGY, Messrs. Bourne & Taylor, 35, Furnivall St., Holborn, W.C.

KENT.—Light Retail, and PRESCRIBING. Returns average £610, at good profits. Large well-stocked shop. Established over 30 years, in present hands 28 years. Price £600. Apply, W. H. TAYLOR & Co., Crown Buildings, 79, Queen St., Cheapside, London.

BUSINESSES FOR DISPOSAL.

MESSRS. BERDOE & CO. have for transfer:—Yorks.—Good-class Retail Dispensing and Prescribing Trade, returning £1700. Net profit £525. Price £1200. East Coast.—Retail and Prescribing Trade. Returns £750. Rent £30. Good house, garden. Price £600. Scotland.—First-class Dispensing Business. Net profit £380. Only £600. South Devon.—Retail and Dispensing Trade, returning £400. Net profit £200. Only £250. Kent Coast.—Retail and Prescribing Trade, neglected. Rent £25. Only £175, including furniture. London, W.—High-class Dispensing Business, returning nearly £2000. Price about £1900. S.W.—Retail and Dispensing. Same hands 15 years. Returns £900. Price £800. N.—Main road. Elegantly fitted. Returns £450. Price £400, including lease, worth £200. Please apply, 30, Jewry St., Aldgate, City.

MID-SUSSEX.—A good-class Retail Dispensing and Prescribing Business, at full prices, owner having a larger business. Returns are £750. Net profit £300. Low rent, convenient house, good garden, shop well fitted, heavily stocked. Price £550, or reasonable offer. Every proof given. Apply to Sussex, 5, South Lambeth Road, S.W.

GENUINE Retail and Prescribing Business in North Staffordshire. Corner shop. Mahogany fitted. Main thoroughfare. Rent low. May be considerably increased by personal attention. Proprietor other business to attend to. Apply, H. B. Dixon, 107, Stafford St., Hanley.

A SOUND Ready Money Light Retail and Prescribing Business in a thriving Market and Manufacturing Town in the Midlands. Splendid opening for one who can Prescribe, Extract Teeth. Returns £400, with big profits. Satisfactory reasons for disposal. Low rent, roomy house, good position. Powder, D. Madden, Lodge Rd., Harborne, Birmingham.

A GENUINE Dispensing and Family Business. Old-established, in good class suburb. Excellent reason for disposal. Principals with £1000 at command to apply by letter, Chemist, 94, Shaftesbury Rd., Crouch Hill, N.

IN a Fashionable Southern Suburb of London, a Retail and Dispensing Business. Main Street. Opposite Post Office. Large double-fronted shop, Dispensing apartment attached. Gross value of £60 per annum. Suit unmarried man. Price from £200 to £230, according to Stock. Surgeon, Drew, Barrow, Bush Lane, London.

JERSEY.—Select Retail, Dispensing, and Prescribing. Double plate. Price £200. Address, Ernest A., 4, Markham Sq., Chelsea, S.W.

OFFERS wanted for the Dispensing Stock and substantial Fixtures of a Chemist's Business. Proprietor deceased. As they must be sold at once, no reasonable offer refused. May be viewed any time during day, on premises, No. 79, Spencer St., Everton, or apply to H. Williams, 15, Margaret St., Liverpool.

SURREY.—Dispensing and Light Retail. Returns under management of Assistant, £400. Good prices are obtained. Nicely fitted and well stocked shop. Good house. Rent, on lease, £30 a year. (Two rooms let off at £40 per annum.) Price £350. W. H. Taylor & Co., Crown Buildings, 79, Queen St., Cheapside, London.

SCOTLAND.—West Coast. Mixed business. 60 years established. No other qualified Chemist. Population over 8000. Returns, with a number of changes in management, average over £600. Formerly over £900. First rate opening for Chemist, Dentist. Price £500. Stock over £400, or offers. Fullest particulars on application to Apothecaries' Company, Virginia St., Glasgow.

BUSINESSES FOR DISPOSAL.

FORTHWITH, by private treaty, the Goodwill, Fixtures, and Stock-in-trade of an old-established Drug business, in the main thoroughfare of one of the most pleasant suburbs of Manchester. Price for goodwill, fixtures, and stock-in-trade £450; or £180 for fixtures and goodwill alone, and the stock-in-trade to be taken by the purchaser at a valuation. Shop rent £40 per annum. Lease could be had of the premises for a term of years if desired. Business capable of extension. A grand opening for an energetic business man. For further particulars apply to Robert Innes, Solicitor, 53, Princess St., Manchester.

THOROUGHLY genuine ready-money Dispensing and Prescribing Chemist's Business, N.W. suburb. Special opening for Dentistry. Handsomely fitted. Long lease. Returns, by Assistant, nearly £500 at full prices. Letters only. Veritas, 27, Fordwych Rd., West Hampstead.

COVENTRY.—Old-established Wholesale and Retail Business, near the centre of the city, owing to recent death of proprietor. Valuable proprietary articles to be included. Good house. Apply, B., care of Wyleys & Co., Coventry.

£300 OR offers.—A good Mineral Water Business, established 18 years (as a going concern). Barnett's No. 1 machinery, cases, bottles, vats, labels, recipes, goodwill, &c. Must be sold. Satisfactory reasons for disposal, or would exchange for Drug Business in main thoroughfare, London. J. Goucher, Pharmaceutical Chemist, Shrewsbury.

PARTNER wanted in a thoroughly good provincial Retail and Surgeon's Wholesale. Capital required about £600 to £800. Bowen & Plant, Solicitors, Dudley.

A GOOD-CLASS Dispensing, Prescribing and Retail Business with Teeth Extracting, in one of the largest towns in the North of England. It is a spacious, well fitted corner shop, plate glass front, with a large, genuine, well selected stock of the best quality. Nett profits last year exceeded £287, and for 1885 £262. Price £520. Full particulars on applying to Dens, care of Messrs. Hodgkinson, Stead & Treacher, 198, Upper Whitecross St., E.C., where photographic view of premises may be seen.

IMPORTANT to Chemists. Complete Fittings to a first-class Chemist's shop for disposal. Window enclosure, mahogany counters, glass-fronted Dispensing screen, wall and other cases, labelled bottles, drawers, &c., quite new. Particulars of H., 4, Stratford Rd., Kensington, W. Fittings to be seen at 47, Church St., Camberwell.

SUBURBAN.—An elegantly fitted corner Retail Dispensing and Prescribing Trade, returning under management, £1200 at full prices. Capable of increase. Splendid chance for Dentist, or a Principal giving his whole time. Long valuable lease. Stock and Fixtures worth £800. Everything, £950. Principal's address, Vendor, 59, Petherton Rd., Highbury.

£100.—Fixtures, Goodwill, Trade Utensils, Stock at valuation, for Dispensing and Light Retail Business in good Country town. Nett profits have reached £100 per annum in 18 months under manager (previously nil through neglect). Rent £17, suit a beginner. Apply, Druggist, Baiss, Bros. & Co., 4, Jewry St., E.C.

LONDON Suburb.—Death vacancy. In good class locality. Light Retail and Dispensing Business. Returns have averaged £400, and net profits £200 a year. Can be greatly increased. Good house, moderate rent Purchaser will have support of influential Medical Practitioner. Price £350. Apply, Taylor & Co., 79, Queen St., Cheapside, London.

BUSINESSES WANTED.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

A COUNTRY Business, producing about £400 nett per annum, or Working Partnership in a larger concern would be entertained. Midlands or near desired, but not essential. Particulars, in confidence, to Mr. Simpson, 10, Princess Ter., Bridlington Quay.

A SMALL Business, payment for the same to be made out of the receipts, by a well-qualified and competent man; or would accept a Working Partnership, which would include the above terms. S. Martin, care of Mr. Goodman, Chemist, W. Norwood, S.E.

A GENUINE Dispensing and good class Family Business. Must bear strict investigation, and show a nett profit of not less than £300 per annum. Midlands or South preferred. Principals are invited to state full particulars, in confidence. Chemist, 18, Mount Ararat, Richmond, Surrey.

A GENUINE Retail and Dispensing Business, returning about £1000, that will bear strict investigation. Convenient house. Suburbs of London preferred. Particulars, with lowest cash price, Statim, 30, Edith Rd., Peckham, S.E.

A FIRST-CLASS Dispensing and Retail Business wanted, about £1000. Address, giving full particulars, Bona Fide, Clarendon Temperance Hotel, Preston.

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AN improving Business, within easy distance of Town. Good eight-roomed house with garden desirable. Cash about £500 ready. Address, in confidence, X., B. 993, Messrs. Deacons, Leadenhall St., E.C.

Mr. G. B. CROCKER,

TRANSFER AGENT & VALUER,

15, WALBROOK, E.C.

Seaside.—First-class Dispensing. Returns £1000. Profits over the average. Price £800. A sound investment, and with energy greatly increased.

North of England.—Old established Retail and Dispensing, with large sale of own specialities. Returns £600. Price £350. Low rental.

Kent.—Light Retail and Dispensing. Returns £800. Price £700. Handsomely-fitted Pharmacy.

Sussex.—Good class country Business. Returns £900. Price about £800. Moderate rental.

London, S.W.—Retail and Prescribing, in busy thoroughfare. Returns £550. Price £500.

TO BE LET OR SOLD,

A SHOP in the best part of the Fulham Road. Has been occupied as a Chemist and Druggist's for nearly 40 years. Apply at 143, Fulham Road.

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CARMINE.—80 lbs. on offer, guaranteed pure, rich colour. Suitable for face powder, colouring powders, confectionery purposes, &c.; dissolves freely in ammonia. Can be seen in stock. Specimen pound supplied, 15s. 6d. C. A. Morris, Carmine Factor, 28, Featherstone St., City Rd., London, E.C.

THE BRITISH AND COLONIAL AGENCY, Limited.—Chemists' Businesses, Partnerships, Openings, &c., London or Country, negotiated. Locum Tenens and Assistants supplied. Valuations, Investigations, &c., undertaken. Outstanding accounts collected. Prospectus free on application. Address, The Secretary, 27, Margaret St., Cavendish Sq., London, W. Bonâ fide Businesses wanted.

A GUARANTEED 5 PER CENT. INVESTMENT.

THE REMAINING SHARES OFFERED AT PAR.

The conversion into a company of an established business (now in a position to profitably employ for its further development and extension additional capital), showing results equal to about 8 per cent. on the capital required to be called up.

The British and Colonial Agency,

LIMITED.

A General Agency and a Mart for the negotiation, transfer, and sale of all descriptions of Practices, Partnerships, Businesses, Properties, &c., and to which is attached a Home for the reception of paying Patients, and a Staff for the Supply of Trained Nurses, &c.

Capital £10,000, in 10,000 Shares of £1 each.

5s. on application, 5s. on allotment, the remainder in calls of three months.

Features.

No promotion money paid.

Vendor takes his interest solely in shares of the Company.

The liability of Shareholders is strictly limited.

There are upon the books the names of about 4000 clients, correspondents, &c., and the business for negotiation represents at present about £750,000, from which considerable profit will be realised.

There are also about *twenty* other departments (forming important sources of revenue) attached to this agency.

There will be no change in the general management.

Dividends of from 10 to 15 per cent. may safely be anticipated.

The Managing Committee is a practical one, consisting of

Frederick May, Esq., 18, Sloane Terrace, London, S.W.

John Ogle, Esq., 7, King's Bench Walk, Temple, London, E.C.

C. Swaby-Smith, Esq., M.R.C.P., &c., Herne Hill London, S.E.

*Charles F. Rideal, Esq., 27, Margaret Street, Cavendish Square, London, W. (*Secretary*).

(*One additional Member to be elected by the Shareholders*).

* Will join after allotment

Bankers.—The London & County Banking Company, Hanover Square, London, W.

Solicitor.—J. F. S. Cridland, Esq, 17, Bedford Row, London, W.C.

Auditors.—Messrs. Hibberd, Bull & Co., *Chartered Accountants*, 17, Kings Arm's Yard, Coleman Street, Bank, London, E.C.

Broker.—R. C. May, Esq., 2a, Copthall Court, Throgmorton Street, London, E.C.

All information, together with prospectuses and application forms, can be obtained from the Company's Registered Offices, 27, Margaret Street, Cavendish Square, London, W.

The British and Colonial Agency, Limited.

NOTICE.

Owing to the number of applications the Directors are able to announce that they will proceed to allotment on Monday, March the 7th, after which the remaining Shares (if any) will be issued at a premium. Applications should therefore be made without delay.

F. J. BRETT,
VALUER, LEICESTER.

VALUATIONS.—It is essential, to prevent disappointment, that engagements should be made early.

Businesses thoroughly investigated for Buyers.

Probate and Fire Insurance valuations.

LONDON (half hour of).—Returns £2500. Net profit £600. Good class old-established country RETAIL, with Wholesale. Capable of increase. Goodwill £300. Valuation of stock and fixtures about £1500.

KENT.—Returns nearly £1000. Good class light country RETAIL. Will bear strict investigation. Price £650.

LANC.—Light Family Retail and PRESCRIBING, with good specialities. Returns £530. Price £400.

NOTTINGHAM.—Retail, Dispensing and PRESCRIBING. Returns £6 week. Price £100.

LIVERPOOL (near).—Returns £1100. Light Family Retail, Dispensing and PRESCRIBING. Price £600, or valuation.

KENT (Seaside).—Returns £900 (nearly). Very profitable light Retail, Dispensing and PRESCRIBING, in small rising town. Large house. Rent £40. Price £750.

LONDON, N.W.—Dispensing, Prescribing and light RETAIL. Under assistant returns £600. Can be much increased. Price £400.

HULL.—Prescribing and light RETAIL, in suburb. Good shop and house. Rent £25. Returns over £400. Price £180.

WESTMORELAND.—Dispensing and light RETAIL. Present returns as Branch £300; has done £600, and would again with attention. Price £200.

LONDON, W.—Light RETAIL, in good suburb. Returns £450. Price £190. Not the cost of fittings.

STAFFS.—General light RETAIL. Excellent opening for Wholesale or Mineral Waters. Returns £900 to £1000. At valuation, £700 to £800.

LANC.—Returns £1000. Dispensing and light RETAIL. Price £600, or valuation.

WILTS.—Country RETAIL. Returns £520. Price £400.

DURHAM Co.—Good RETAIL, with valuable specialities. Returns £800 to £900. Rent £46. Nett profit £300. Price £650.

NORTH.—Family RETAIL, with Wholesale and Shipping. Same hands many years. Ill health sole cause of sale. Returns about £4000. Valuation about £2000; part can remain.

LINCOLNSHIRE.—Good Family RETAIL. Returns £700. Valuation about £600.

VENDORS of first-class Retail and Dispensing Businesses returning £1500 to £3000 can be at once *and privately* supplied with buyers, F. J. Brett having on his books gentlemen prepared to pay cash.

Transfers, Valuations and Auctions conducted throughout the United Kingdom by Mr. BRETT, Leicester.

WHAT OFFERS?

LIEBIG'S Condenser; 5 yards double-texture Waterproof Sheeting, 72 inches wide; one Y. G. Co.'s gallon graduated glass Percolator; one half-gallon ditto, not graduated; "Enterprise" Drug Mill, nearly new; 3 lbs. very fine Turkey cup Sponge, 1½ to 2 ozs. each; two, each new, compo. Funnels; Nos. 4, 5, 7, 8 and 9, five 3-pint glass Funnels; twelve assorted glass Retorts; two circular white marble Slabs, 10 and 12 inch; eight 2-pint "Lipscombe's" glass Table Filters, new; mahogany Cigar Case, 27 inches long, good as new, as Maw's A 34 (improved); splendid mahogany and plate glass Centre Case, 5½ ft. long, 3 ft. wide, 4 ft. 9 in. high, bent tops, sponge case front glass case sides, seven drawers. F. WARREN SMITH, Yeovil.

CHEMISTS' TRANSFERS.

32, LUDGATE HILL, LONDON.

MESSRS. ORRIDGE & CO., CHEMISTS' TRANSFER AGENTS, may be consulted at the above address on matters of SALE, PURCHASE, and VALUATION.

The Business conducted by Messrs. ORRIDGE & Co. has been known as a Transfer Agency in the advertising columns of the PHARMACEUTICAL JOURNAL since the year 1846, and is well known to all the leading firms in the Trade.

VENDORS have the advantage of obtaining an opinion on Value, derived from extensive experience, and are in most cases enabled to avoid an infinity of trouble by making a selection from a list of applicants for purchase, with the view of submitting confidential particulars to those alone who are most likely to possess business qualifications and adequate means for investment.

PURCHASERS who desire early information regarding eligible opportunities for entering business will greatly facilitate their object by describing clearly the class of connection they wish to obtain.

N.B.—No Charge to Purchasers.

Messrs. ORRIDGE & CO. are instructed to transfer:—

1. LONDON, W.—First-class Retail and Dispensing BUSINESS, situate in a good position. Returns at present about £800. Lease for 21 years. Easy terms can be arranged to an immediate purchaser.
2. LONDON.—Good business locality. Retail, Dispensing and good Family TRADE, with Post Office attached. Gross returns over £800. Profits (proof) considerably above the average, £350 nett. Good house. Small garden and greenhouse. Vendor, anxious for early sale, will accept £650. Please enclose card or reference.
3. EASTERN COUNTIES.—Good town. Retail, Dispensing and PRESCRIBING. Returns between £600 and £700 yearly. Good house. Large garden. Price £450. References to wholesale houses given and required.
4. NORTH MIDLANDS.—Good class BUSINESS, Retail and Dispensing. Returns over £1300, with good profits. Personal introduction will be given. Large house, with every convenience. Price about £1050.
5. YORKSHIRE.—Large town. Good Family BUSINESS. Returns last year nearly £1700. Profits nearly £500. Large, double-fronted shop, well-fitted. Good house. Premises vendor's own, and nearly new. Price about £1200.

WANTED.

WANTED.—First-class Dispensing Businesses, either in London or good Provincial Towns. Profits not under £500 yearly.

WANTED.—Partnership, in a Wholesale House, London or Provinces.

Personal applicants receive Messrs. O. & Co.'s direct attention and advice, where required, free.

VALUATIONS.

Terms for valuation on application.

Appointments by post or wire have immediate attention.

ORRIDGE & CO.

32, Ludgate Hill, E.C.

Schacht's Liquor Bismuthi.

Absolutely pure. The original preparation, invented and introduced to medicine by Mr. G. F. Schacht in 1855. Its distinct superiority is universally admitted. In ½lb., 1lb., 2lb., and 5lb. bottles.

Schacht's Syr. Cinchonæ Alcoholic.

A standardized, reliable preparation, contaihing the entire medicinal properties of the finest Cinchona Bark. It is, in fact, *Bark minus the woody fibre.* Dose, ½ drm. In ¼lb., ½lb., and 1lb. bottles.

Schacht's Pepsina Liquida.

A tasteless and odourless fluid pepsine of extraordinary activity. One teaspoonful will peptonise one thousand grains of albumen, which is equivalent to the digestion of two hard-boiled eggs. 4oz. bottles, in carton cases, *retail* at 2s. 6d. For dispensing, ½lbs. 3s. 9d., 1lbs. 7s. each.

Schacht's Pepsina Liq. c Bismutho.

Each drachm contains in a concentrated form, besides the fluid pepsine, a full dose of Schacht's Liquor Bismuthi. An elegant and successful combination. Dose, ʒj. For dispensing, ½lbs. 3s. 9d., 1lbs. 7s. each.

Schacht's Pepsina Liq. c Euonymin.

Each drachm contains one grain of soluble Euonymin. Dose, ʒj. Price for dispensing, ½lbs. 3s. 9d., 1lbs. 7s. each.

Schacht's Infallible Rennet.

An entirely new Essence, perfectly reliable, and will not cause vexatious failures with consequent friction between buyer and seller. NO SALT. No special taste, smell, or colour. Handsomely put up in large 1s. bottles, which sell freely.

Schacht's Syr. Sennæ Aromat.

The best "Sweet Essence." Prepared entirely in the cold. Active, with no tendency to gripe. 2s. per lb.

Schacht's Liq. Rhamni Frangul.

A real Aperient, mild and constant. Dose, ʒij. to ʒiv. 3s. per lb.

Of all leading Wholesale and Retail houses in Great Britain, India, and the Colonies.

MANUFACTURERS,

GILES, SCHACHT & CO.

PHARMACEUTICAL CHEMISTS,

CLIFTON, BRISTOL.

London : Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street.

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 871.] SATURDAY, MARCH 5, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

ANNUAL SUBSCRIPTIONS.

All Annual Subscriptions are now due.

Subscription payable by Members and Associates in Business £1 1 0

Subscription payable by Associates and Apprentices or Students 0 10 6

Cheques and Post Office Orders should be made payable to the Secretary, and crossed "London and Westminster Bank."

EVENING MEETING.

17, BLOOMSBURY SQUARE, LONDON.

An Evening Meeting of the Society will be held at 17, Bloomsbury Square, London, on Wednesday next, March 9th, at half-past Seven o'clock.

The chair will be taken at Eight *precisely*.

The following papers will be read :—

"Note on Linimentum Terebinthinæ and Sapo Mollis." By Emeritus-Professor REDWOOD.

"A contribution to the Pharmacognosy of Strophanthus." By W. ELBORNE.

"Notes on Strophanthus." By H. HELBING.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

ELECTION OF COUNCIL AND AUDITORS.

EXTRACT FROM THE BYE-LAWS.

SECTION 5, CLAUSE 3.—"Any person qualified to vote desirous of nominating any Member for election as a Member of the Council or as an Auditor, shall give notice in writing, with the name and address of the nominee, and, if for the Council, disclosing whether such nominee be or not a Pharmaceutical Chemist, to the Secretary of the Society, *on or before the 24th day of March*, in every year; and the Secretary shall, on or before the 26th day of March then instant, address and send by post to each nominee a notice of his having been so nominated, and inquiring whether he will accept office if elected, and in default of a written reply from such nominee, declaring his readiness to accept office, if elected, being received on or before the 31st day of March then instant, such nominee shall not be deemed eligible or willing to be elected."

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 11 a.m., on the second Tuesday in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself :—

Aberdeen	Cheltenham	Inverness	Norwich
Birmingham	Darlington	Jersey	Nottingham
Brighton	Douglas, Isle of Man	Lancaster	Oxford
Bristol	Dundee	Leeds	Peterborough
Cambridge	Edinburgh	Lincoln	Sheffield
Canterbury	Exeter	Liverpool	Shrewsbury
Cardiff	Glasgow	London	Southampton
Carlisle	Guernsey	Manchester	Truro
Carmarthen	Hull	Newcastle	Worcester
Carnarvon		Northampton	York

* A Certificate of having passed any of the examinations approved by the Council (a list of which may be obtained from the Registrar) will be accepted in lieu of this Examination, provided Latin, Arithmetic, and English were included in the subjects of the Examination for which the Certificate was granted.

The Certificate must be forwarded to the Registrar, with the fee of Two Guineas, for the approval of the Board of Examiners, and must be so approved before the Candidate is eligible to enter his name for the Minor Examination.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

FORTY-FIFTH SESSION, 1886—87.

Commencing on the 1st of October.

Emeritus Professor REDWOOD.....CHEMISTRY AND PHARMACY.

Professor BENTLEY .....BOTANY AND MATERIA MEDICA.
Professor WYNDHAM DUNSTAN .....CHEMISTRY.
Professor ATTFIELD .....PRACTICAL CHEMISTRY.
Mr. JOSEPH INCE .....PHARMACY AND PRACTICAL PHARMACY.

RE-COMMENCEMENT OF LECTURE COURSES.

The Course of Lectures on "Chemistry" will re-commence on Tuesday Morning, March 1st, at 9 o'clock, and on Botany and Materia Medica on Thursday, March 3rd, at 9 o'clock, when Professor Bentley will give his first Lecture on Botany. The Course on Materia Medica and Botany will include the Lectures on Systematic and Practical Botany, which will be delivered in the Gardens of the Royal Botanic Society, Regent's Park.

THE LECTURES ON BOTANY AND MATERIA MEDICA

are on Thursday, Friday and Saturday mornings, at 9 o'clock, and comprise the following subjects:—

1. Structural and Physiological Botany, which is especially adapted to meet the requirements of pharmaceutical students.
2. Organic Materia Medica, comprising the medicinal substances obtained from the organic kingdom, which are considered in the order of the natural historical relations of the organized beings which produce them.
3. Systematic and Practical Botany, which is taught during the summer months in the Royal Botanic Society's Gardens, Regent's Park.

All the Lectures are fully illustrated by every means to which recourse can be had, including fresh, dried, and preserved portions of plants, together with their products and secretions; and by an extensive series of drawings, diagrams, and preparations, as well as by experiments and microscopical preparations.

In order to test the proficiency of the pupils, and to bring them into more intimate intercourse with the Professors, a *viva voce* examination is held after each Lecture. It is expected that all pupils will attend these examinations.

THE LECTURES ON CHEMISTRY

are on Monday, Tuesday and Wednesday mornings, at 9 o'clock, and comprise the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.
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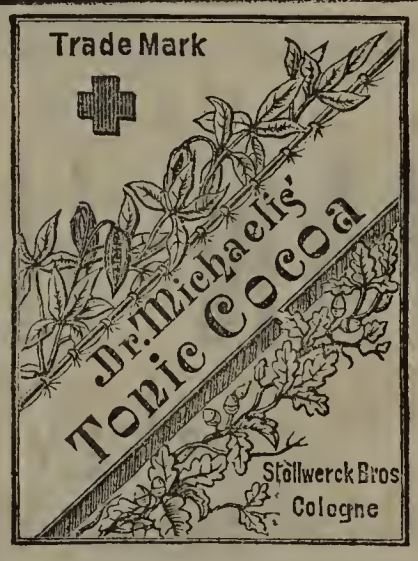

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A daily luxury for rich and poor.

VAN HOUTEN'S COCOA

Guaranteed pure and soluble,

Is SIMPLY UNEQUALLED and, although a little dearer, really THE CHEAPEST in the end.

A cup of **this** cocoa costs no more than a cup of tea, and is **a highly nutritive** beverage.

Digested with marvellous facility by the most delicate invalids and children.

Made instantly with boiling water.

The **British Medical Journal** says:

"'Van Houten's Cocoa' is admirable. In flavour it is perfect, and it is so pure, well prepared and rich in alkaloid that it may with great advantage be largely used in public institutions, as well as in private families."

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Invaluable in railway stations, hospitals, on board ship, in the camp, for workmen (at home and to take to their *work*), etc., etc.

Try it once and you will use and recommend it always.

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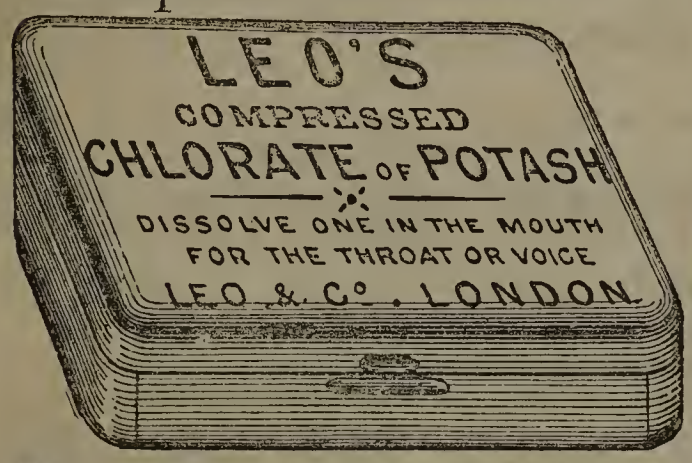

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SOLE MAKERS IN GREAT BRITAIN OF

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BIRMINGHAM:—Moor Green Fields.
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Medical Glass, Earthenware, Utensils, &c.

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Complete Fittings for Chemist's Shop, fixing included.

SAVE 25 PER CENT.

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"I feel it is only due to you to say that this is now the third shop you have fitted for me to my entire satisfaction, and at prices considerably below other fitters."

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"The screen and counter case came to hand yesterday. I am very well pleased with them both; and when I get them fitted up they will have a very effective appearance."

From Mr. Freeman, 89, Linthorpe Road, Middlesbro'.

"I am delighted with the wall-fitting; it is well worth what I paid you for it."

From Mr. Kay, Chemist, 143, Northenden Road, Sale, Cheshire.

"The drawers arrived on Friday, and glass cases yesterday, quite safe. I am very much pleased with the work, and shall be glad to answer any references."

GEORGE TREBLE & SON, Medical Shop Fitters & Plate Glass Show Case Makers.

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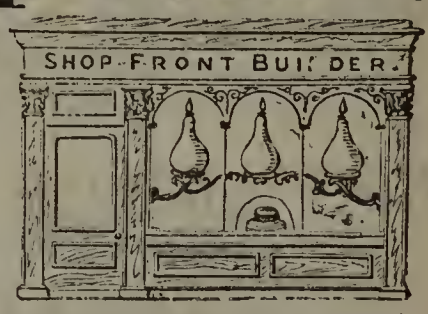
Shops fitted by S. H., and to whom references are kindly permitted:—

Messrs. Corbyn, Staccy & Co., 7, Poultry, E.C.
Mr. H. Deane, Clapham, London.
,, John Broad, Rise House, Hornsey Rise, N.
,, N. Nicholson, Canonbury, London.
&c. &e. &c.

Messrs. Leath & Ross, St. Paul's Church Yard, London.
,, Harvey & Reynolds, Leeds.
Mr. W. F. Smith, 280 Walworth Road, S.E.
,, Thomas Hall, Lowestoft.
&c. &e. &e.



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NORWEGIAN COD LIVER OIL

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The first shipment of New Oil from the Lofoden district is now on its way home to us, and is due about 7th March. Samples on application, with quotations, in the Original Barrels or in Winchesters.

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I am not only pleased, but delighted, with the shop you have just fitted for me.
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For Chemists' Shop Fittings, I consider your style and workmanship unique.
Wilson & Son, Chemists, Harrogate.

Both my shops at Westgate and Clacton-on-Sea are much admired, and I am well pleased with your work.
C. H. Grosvenor, Chemist, Clacton-on-Sea.

You have now fitted up three shops for me, each one having given me greater satisfaction: and if I required 20 shops I should put them into your hands to fit up.
I. H. Bateman, Brondesbury, Kilburn.

Your Pharmaceutical Dispensing Counter I consider complete in every detail, and great care appears to have been taken in packing.
H. B. Williamson, Wanganui, New Zealand.

Your workmanship is excellent, and was completed with promptitude and dispatch.
F. J. Clarke, Bracebridge Hall, Lincoln.

You may refer any applicant who requires his shop fitted to me. I am perfectly satisfied with the work done and the amount charged. The shop is universally admired.
J. Herington, Leighton Buzzard.

I consider your design and workmanship unequalled for Chemists' Shop Fittings, and I shall be pleased to recommend you.
C. Robinson, Streatham.

My shop at Wimbledon has been much admired, and I am very pleased with the manner in which you have executed the work.
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Eff. Cin Chouce Liq. (DeVry)	*A true liquefied Cinchona*
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Eff. Cin Chouce Liq. (DeVry)	*means of apparatus specially*
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Eff. Cin Chouce Liq. (DeVry)	*The organic constituents of*
Eff. Cin Chouce Liq. (DeVry)	*the Bark are thus protected*
Eff. Cin Chouce Liq. (DeVry)	*from the changes induced by*
Eff. Cin Chouce Liq. (DeVry)	*heat and oxidation, and their*
Eff. Cin Chouce Liq. (DeVry)	*peculiar properties preserved*
Eff. Cin Chouce Liq. (DeVry)	*intact. The Extract forms,*
Eff. Cin Chouce Liq. (DeVry)	*when diluted with distilled*
Eff. Cin Chouce Liq. (DeVry)	*water, a permanently clear*
Eff. Cin Chouce Liq. (DeVry)	*solution, not to be distin-*
Eff. Cin Chouce Liq. (DeVry)	*guished from fresh infusion*
Eff. Cin Chouce Liq. (DeVry)	*of Bark. Being of definite*
Eff. Cin Chouce Liq. (DeVry)	*strength, the dose of the Ex-*
Eff. Cin Chouce Liq. (DeVry)	*tract may be determined with*
Eff. Cin Chouce Liq. (DeVry)	*scientific accuracy, and by its*
Eff. Cin Chouce Liq. (DeVry)	*use Cinchona Bark may be*
Eff. Cin Chouce Liq. (DeVry)	*administered with a pre-*
Eff. Cin Chouce Liq. (DeVry)	*cision previously unknown.*

Descriptive Pamphlet, with full Medical Reports, and other information, together with Trial Specimens, free on application to the Sole Manufacturers,

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The Pharmaceutical Journal.

SATURDAY, MARCH 5, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

IMPORTANT DECISION UNDER THE PHARMACY ACT.

THE report of the case lately tried at Edinburgh, as given in full at page 732, *et seqq.*, of the present number, is of sufficient importance to be worth careful perusal; but as it is very lengthy and encumbered by the technicalities of Scotch law, a brief *résumé* of the main facts will probably be acceptable to our readers. The prosecution was instituted by the Pharmaceutical Society, under the 15th section of the Pharmacy Act, for infringement of the provisions of that section by WILLIAM BAILLIE, who as an unregistered person kept an open shop for the retailing, dispensing and compounding of poisons, and on the 17th December sold a scheduled poison in contravention of the provisions of the Act. The shop in question was not kept in the name of WILLIAM BAILLIE, but under the style of CENTER and Co., and it appeared that there is a kind of partnership between WILLIAM BAILLIE and a Mr. CENTER, who is a registered chemist. The nature of this partnership, as stated in evidence, is somewhat peculiar, inasmuch as the whole capital in the business, including cash in bank, goodwill, stock-in-trade, utensils, fittings, prescription books, etc., belong to Mr. BAILLIE, while Mr. CENTER'S interest in the business is merely a participation in the profits to a specified extent, and Mr. BAILLIE has the power to terminate the contract on giving three months' notice to that effect. Consequently the position of Mr. CENTER was held by the counsel for the prosecution to be practically nothing more than that of a person receiving a certain annual salary, who might be dismissed on three months' notice; that hence the business of CENTER and Co. was to all intents and purposes the property of Mr. BAILLIE, and upon that ground he was prosecuted under the 15th section of the Act for keeping open shop as well as for the sale of a scheduled poison.

At the opening of the case, however, the counsel for the defence took objection to the charge that two offences had been committed as the complaint averred, and to the liability of the accused to two penalties founded on the same Act. This objection was admitted by the Sheriff to be well founded. He held that he could not convict on both counts of the complaint, and that there could not be a double penalty for the same offence under the same enactment. As a result of this technical objection it became necessary to strike out part of the charge, and on the claim of the counsel for the defence that he should know at that stage what particular charge was relied upon, the second count of keeping open shop was abandoned. Another objection, that no offence was constituted under the 15th section, and that the charge was not made under the first section of the Act constituting an offence was overruled by the Sheriff.

In the trial of the case the facts alleged by the prosecution as to the sale of a scheduled poison were established in evidence. For the defence it was contended the facts proved in evidence did not amount to a contravention of the statute on the ground that the sale had been by or for a company, and though the hand that dispensed the drug was the hand of one who was not a qualified person in the terms of the Act, he was a servant, and at the time acting as the agent of the company whose sale it was. In pursuance of this argument it was shown that there is nothing in the Pharmacy Act to prevent persons forming a company or association for the purpose of dispensing the articles which are dealt with by the Act, and it was contended that the only thing necessary was that the business should be carried on under the charge of a competent man with sufficient practical knowledge. It was also urged that the statute was not one that had been introduced for the sake of chemists; but one for the protection of the public, and that the question was whether the safeguards intended by the statute to prevent mischief had been observed or not. Such safeguards, or what was tantamount to them, it was contended by the counsel for the defence had been observed. According to his view, the case was not one where the parties were trying to evade the statute, and putting themselves in a position that could only be held by men qualified according to the conditions of the statute, because the firm had as one of its partners a man who was entitled to deal with the drugs mentioned in the Act. In support of this argument reference was made to Lord SELBORNE'S judgment in the case of the Pharmaceutical Society against the Supply Association, where he said "It "is true that the Legislature has in the Acts required "for the benefit of the public this safeguard that "there should be an assistant duly qualified; but "the Legislature says that having that case in view, "it was not thought necessarily inconsistent with "the object and policy of the Act that the members "or proprietors of the business, the persons deri-"ving profit from it, or to whom those actually "selling the drugs would be responsible, might be "unqualified persons provided there was in the busi-"ness a duly qualified assistant. It by no means

"follows that all the drugs would necessarily be sold "by that duly qualified assistant, or that he might "not be under the general superintendence of a "manager not himself duly qualified. All that "is left open." These remarks it was contended had a direct bearing upon the present case, since they might be taken to mean that it was left open to the Court to consider whether, after all, looking to the arrangements in connection with the business in question, reasonable precautions were taken for the safe-guarding of the public. This was maintained to be the condition of things in the present case, and the copartnership of such a nature as might be expected where an arrangement was made between capital on the one hand and skill on the other.

The Sheriff, in giving judgment, said that owing to one count of the charge having been struck out, it would be unnecessary to consider whether the partnership contract really tended or was an attempt to evade the provision of the 15th section of the Pharmacy Act; but in regard to the other count he held that the purpose of the Act being to impose restrictions on the sale of poison for the protection of the public it was just to prevent persons who had no knowledge of these matters from being allowed to dispense them to the public, and there was no doubt that there had been a sale of a poison by a person not duly registered and within the very letter of the provisions of the 15th section of the statute. In reference to the quotation from Lord SELBORNE's judgment and to the argument based on the fact that one of the partners was qualified the Sheriff held that it was not doubtful the opinion of Lord SELBORNE and the other judges was that a person who sells drugs or poisons must be duly qualified, although he may be employed by a corporation or a person who has not a qualification. Any practice of a contrary nature he held would be wrong, and should be put an end to, and in the present case, as it had been proved that poison was sold by an unqualified person, he found for the prosecution, and fined the accused in a nominal penalty. Application was made for a case for appeal, and this was granted by the Sheriff; but we have been informed that this has since "been departed from by the accused."

We learn from the *Sei-i-Kwai* Medical Journal that Japan has adopted another mark of Western civilization, and has now an official Pharmacopœia. The work is the compilation of a Committee appointed in 1880, consisting of twenty-one members, the majority of whom were natives, but including such Europeans as the late Dr. Geerts, Dr. Eykman, Dr. Langgard, and Dr. van der Heyden. The work, which consists of nearly four hundred octavo pages, is described as being divided into three parts, the Preface, the Pharmacopœia, and the Appendix. The Preface contains a history of the proceedings of the Committee and the rules followed in the compilation, together with definitions of the principal technical and other terms used. It is also therein stated that the work was originally written in the German language, as being understood by most of the members of the Committee, but that nevertheless the Japanese version is to be considered the official text. It is intended to publish the work eventually also in Latin. The Pharmacopœia contains 475 articles, nearly all of which are official in the British, German, and United States Pharmacopœias. Each article is arranged in alphabetical order according to the Latin name, but this is preceded by the Japanese name. The Latin nomenclature adopted resembles pretty closely that of the British and United States works, but shows traces of German proclivities in the use of such forms as Kalii, Natrii, and Chininum. Under the title of each article is given a description of its appearance and taste, tests for its purity, and method of preparation. In the formulæ for compounds the proportions are given in parts, but the metric system forms the basis of all measurements. The Appendix contains lists of dangerous and powerful remedies, doses, solubilities, etc.

* * *

The next Evening Meeting of the Pharmaceutical Society will be held on Wednesday, the 9th instant, when Emeritus-Professor Redwood, in a "Note on Linimentum Terebinthinæ and Sapo Mollis," will deal with a subject that has evoked considerable discussion in these columns. The other papers will be "A Contribution to the Pharmacognosy of Strophanthus," by Mr. W. Elborne, and "Notes on Strophanthus," by Mr. H. Helbing. The chair will be taken at eight o'clock, but the theatre will be open an hour previously for the exhibition of donations to the Museum and other articles of interest, and the Curator will be in attendance to give information respecting them.

* * *

In the opinion of the editor of the *American Druggist* the supply of the natural oil of wintergreen or birch will soon cease to be of any commercial importance, since the artificial product (salicylate of methyl), to which reference was made recently in these columns, is now being prepared of such good and uniform quality that it will undoubtedly replace the natural oil. Moreover, the artificial article can be produced at a cost below that at which the natural oil can be distilled profitably.

* * *

Some samples of an efflorescence occurring on the soil in California, examined by Professor Attfield, have been found to consist of thenardite (sodium sulphate) more or less pure.

* * *

A meeting of the London Section of the Society of Chemical Industry will be held at Burlington House on Monday evening next, March 7, when papers will be read by Messrs. Cross and Bevan on "M. Hermite's System of Electrolytic Bleaching," and by Mr. Jas. Mactear on I. "Castner's Sodium Process," II. "A New Method of Elevating Liquids Specially Applicable to Acids." The discussion on the papers will be taken on April 4th.

* * *

The ninth annual dinner of the Chemists' Assistants' Association will be held at the Holborn Restaurant on Wednesday, the 16th instant, at 8 p.m. The chair will be taken on this occasion by the President of the Pharmaceutical Society.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, March 2, 1887.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

Messrs. Allen, Atkins, Borland, Bottle, Butt, Cross, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Southall, Symes, Williams and Woolley.

The minutes of the previous meeting were read and confirmed.

The PRESIDENT said he had received a letter from the Vice-President saying he was unable to attend owing to a slight attack of bronchitis. He was sure the whole Council would join in the hope that Mr. Gostling would soon be restored to his usual state of health.

DIPLOMAS.

The following, being duly registered as pharmaceutical chemists, were respectively granted a diploma stamped with the seal of the Society:—

Barnes, William Robert.
Bury, James Edward.
Edwards, Alfred Egbert.
Parkinson, William.
Puckey, William.
Stark, Arthur Campbell.
Wood, Arthur William.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Barnes, William Robert .....Plaistow.
Edwards, Alfred Egbert.....London.
Lewis, Arthur John.....Abergavenny.
Parkinson, William .....Driffield.
Puckey, William .....Leicester.
Robb, David.....Horbury.
Stark, Arthur Campbell .....London.
Wood, Arthur William .....Harrogate.

Chemists and Druggists.

The following, who were registered as being in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Fuller, John .....Willesden.
Ing, John .....Aldeburgh.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Bell, Edward Wrightman .....Boston.
Branston, John William.....Spalding.
Cormack, George .....Newcastle-on-Tyne.
Neal, William .....Croydon.
Oliver, John Robert.....Great Yarmouth.
Parrott, John .....East Molesey.
Snoxell, Samuel .....Guildford.
Thomas, Daniel G. .....Cardigan.
Williams, Ernest B. Billing ...Ponders End.

ASSOCIATES.

Minor.

The following having passed their respective examinations and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Anderson, George Harwell.....Edinburgh.
Blankley, George William .....Arnold.
Catterall, Cuthbert George.....Pontefract.
Clark, William Alfred .....Southampton.
Clayton, John .....Scorton.
Crossling, Frank .....Newcastle-on-Tyne.
Elsdon, Herbert William .....Wells.
Emerson, Richard Wm. James.Hull.
Flint, Richard .....Loughborough.
Harwood, Henry Webster .....Portsmouth.
Heaton, Simon Wood .....Leeds.
Hobson, Edmund.....Cheadle.
Kneale, James Coole .....Douglas.
Lamplough, James William ...London.
Lawrence, Arthur Frederick .. Cambridge.
McRither, Alexander Buchan ..Dundee.
Millen, Herbert Alfred .....Peckham.
Milner, Henry Robert.....Doncaster.
Parish, William .....Cleator Moor.
Sinclair, William Austin.....Leamington.
Sowden, Joseph .....Bowling.
Thomas, John .....Oswestry.
Walden, Henry Ernest .....Southampton.
Wallace, William.....Edinburgh.
Wilson, John .....Aberdeen.
Wilson, John Anderton .....Chorley.

Modified.

Duff, William .....Edinburgh.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Beadle, Thomas Alfred .....London.
Beales, Walter William .....Eye.
Botterill, Frederick William ...Otley.
Bunn, John Edwin James .....Newent.
Callaway, James Thomas .....London.
Carter, Henry .....Kendal.
Choat, Joseph Newsom .....Lynn.
Daniel, John, jun. .....Dumfries,
Dewing, Charles .....New Malton.
Evans, David John .....Machynlleth.
Gibson, Ernest .....South Shields.
Gough. John.....Shrewsbury.
Hamlin, Charles Booth .....Crediton.
Hindman, John .....Kirkintilloch.
Knowles, Louis .....Leicester.
Laycock, William Frederick ...Lowton.
Martlew, Ernest Hercules .....Southsea.
Peach, Charles William .....London.
Popham, Henry Nicholas .....South Shields.
Pye, Alexander Greig .....Atherstone.
Raimes, Richard, jun.....Edinburgh.
Reid, David ....Bathgate.
Rollett, Harry .....Lincoln.
Stanley, James .....Bulwell.
Stokes, William Charles.....Weymouth.
Thorp, Walter Thomas .....Glossop.
Walters, Edwin .....Ashton-under-Lyne
Watson, Henry.....Spennymoor.
Watson, Lindley Arthur.....Beccles.
Webster, John William .....Dewsbury
West, David Dudley .....London.
Williams, Thomas John .....Plymouth.
Wippell, Alice Mary .....Perth.
Woodward, Moses Mellor .....Nottingham.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

ADDITION TO THE REGISTER.

The Registrar reported that—
Joseph Shaw, 1, Queen Street, Hurst, Ashton-under-Lyne,

having made a statutory declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been duly supported, his name had been placed on the Register.

The PRESIDENT read a letter from Mr. J. B. Stephenson, acknowledging the resolution of thanks passed at the last meeting of Council.

THE CONVERSAZIONE.

The PRESIDENT also stated that a letter had been received from the Science and Art Department saying that the South Kensington Museum would be placed at the disposal of the Society on Wednesday evening, May 18, for the Conversazione.

REPORTS OF COMMITTEES.

FINANCE.

The report and recommendations of this Committee were received and adopted on the motion of the President, who said the only item calling for special notice was the printing account for the Register, which was usually nearly covered by the sales during the year.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants :—

£10 to a former member (1843 to 1864), (aged 70). Applicant has had twelve previous grants. (Sussex.)

£5 to a registered chemist and druggist (aged 50). In bad health, and unable to earn anything. (Scotland.)

£15 to the widow (aged 51) of a member. Applicant has three children dependent on her. (Kent.)

£15 to the widow (aged 56) of a member and subscriber, entirely without means and dependent on her friends. (Yorkshire.)

£10 to the widow (aged 50) of a registered chemist and druggist. Applicant has had five previous grants; has two children dependent on her. (Lincolnshire.)

Two cases had not been entertained, and two had been deferred for further inquiries.

Mr. ROBBINS moved the adoption of the report, and explained one of the cases which had not been entertained.

After some discussion on one case it was referred back to the Committee.

With this exception the report was adopted.

LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

Library.

The report of the Librarian had been received, including the following particulars :—

	Attendance.	Total.	Highest.	Lowest.	Average.
January.	Day . . .	377	23	1	14
	Evening .	151	13	2	7

Circulation of books.	Town.	Country.	Total.	Carriage paid.
January. . .	139	127	266	£1 12 5½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

For the Library in London—

Newcastle-upon-Tyne Public Libraries, Supplementary Catalogue, 1887. From the COMMITTEE.

Shimoyama (Y.), Beiträge zur Kenntniss des japanischen Klebreises, Mozigome, 1886. From the AUTHOR.

Thomson's Conspectus, adapted to the British Pharmacopœia of 1885, new ed., 1887. From the PUBLISHERS.

Bentley (R.), Manual of Botany, 5th ed., 1887. From the AUTHOR.

British Pharmaceutical Conference, Year-Book of Pharmacy, 1886, 2 copies. From the CONFERENCE.

Ephemeris of Materia Medica, etc., vol. 3., no. 1. From Dr. E. R. SQUIBB.

American Pharmaceutical Association, Proceedings, 1886. From the ASSOCIATION.

Royal Gardens, Kew, Bulletin of Miscellaneous Information, no. 1, 1887. From the DIRECTOR.

For the Library in Edinburgh—

Ephemeris of Materia Medica, etc., vol. 3, no. 1. From Dr. E. R. SQUIBB.

American Pharmaceutical Association, Proceedings, 1886. From the ASSOCIATION.

British Pharmaceutical Conference, Year-Book of Pharmacy, 1886. From the CONFERENCE.

The Committee recommended the purchase of the undermentioned works :—

For the Library in London—

British Pharmacopœia, 1885, corrected edition.
Kelly's Directory of Chemists and Druggists.
Life and Labours of John Mercer, 1886.
Hayward, Botanist's Pocket-Book, 5th ed., 1887.
Oliver, Lessons in Elementary Botany, new ed., 1886.
Smith, Domestic Botany, 1883.
Radcliffe, A new Departure in Science, 1886.
Lockyer, Chemistry of the Sun, 1887.
Goebel, Outlines of Classification and Special Morphology of Plants, 1887.
Hay, Handbook of British Fungi.
Flora of Leicestershire.
American Homœopathic Pharmacopœia, 3rd ed., 1885.

For the Library in Edinburgh—

Abney, Treatise on Photography.

Museum.

The Curator's report had been received, and included the following particulars :—

	Attendance.	Total.	Highest.	Lowest.	Average.
January	Morning .	362	24	4	14
	Evening .	94	14	1	4

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

Specimen of Mwavi Bark, and two Strophanthus pods. From Mr. J. W. MOIR, Edinburgh.

A collection of Native Remedies used at the Cape of Good Hope, and thirty-nine herbarium specimens of the same. From the ACTING COMMISSIONER, Cape of Good Hope Court, Colonial and Indian Exhibition.

Two trunks of Cinchona Trees from Ceylon. From Mr. THRING.

Twelve bottles of essential oils prepared from Queensland plants. From Sir J. L. GARRICK, K.C.M.G., Q.C., Agent-General for Queensland.

Nine photographs of microscopical sections of plant stems, etc. From Mr. J. MILTON OFFORD, F.R.M.S.

A specimen of Guadaloupe Vanilla. From Mr. J. C. FILLAN, Dominica.

Two pods of Strophanthus. From Messrs. BURROUGHS and WELLCOME.

Specimen of the essential oils of *Pastinaca grandis*, *Nardostachys Jatamansi*, and Daroo wood. From Mr. D. S. KEMP.

Specimen of malformed Lemons grown at Mentone. From Mr. E. S. BALCHIN.

Specimen of pure Aconitine. From Messrs. HOPKIN and WILLIAMS.

Specimen of recrystallized Proteacin, and of Phloroglucin obtained from Kino (*Pterocarpus Marsupium*). From Dr. THEODOR SCHUCHARDT, Goerlitz.

Specimen of fasciated stem of Daphne.
From Mr. H. H. POLLARD, Ryde.
Specimen of Resin from the ruins of Tepaneh in Egypt.
From the COMMITTEE of the Egyptian Exploration Fund.

The Assistant Secretary, Mr. J. Rutherford Hill, had reported the following donation to the Museum of the Society in Edinburgh :—

Specimen of the inner bark of the New Zealand Ribbon Tree (*Plagianthus betulinus*), resembling lace bark.
From Mr. J. NICHOL, Waikaka, New Zealand.

The Curator further reported that one hundred and twenty materia medica specimens for the Museum of the Pharmaceutical Society of Australasia had been forwarded through Messrs. Rocke, Tompsett and Co. Twenty-six specimens of materia medica and fifty-two specimens of medicinal plants had been forwarded to the Oldham Chemists' Assistants' Association. A series of duplicate specimens of colonial drugs had been forwarded to the Museum of the Royal Gardens at Kew.

Professors Attfield and Dunstan had attended and reported on their respective classes.

The purchase of some bottles for the Museum and Laboratory, and some necessary repairs in the Library were recommended.

The PRESIDENT moved the adoption of the report and recommendations, which was unanimously agreed to.

CONVERSAZIONE.

The report of this Committee stated the arrangements which had been made for the issue of tickets, refreshments, music, etc., at the ensuing Conversazione, which were substantially the same as on previous occasions.

The PRESIDENT moved the adoption of the report, which was unanimously agreed to.

LAW AND PARLIAMENTARY.

Pharmacy Bill and Early Closing Bill.

The report of this Committee stated what had been done by the President with regard to the introduction of the Pharmacy Acts Amendment Bill into the House of Lords, the Bill having been read a first time on the motion of Lord Milltown.

The Early Closing Bill introduced in the House of Commons by Sir John Lubbock had been considered, and the Committee recommended that it be authorized to take steps for procuring the entire exemption of pharmaceutical chemists and chemists and druggists from the operation of this Bill if carried.

The PRESIDENT moved the adoption of the report. With reference to the first part of it, he said the members would probably have seen that the Bill had been introduced into the House of Lords, and the noble lord who had charge of it endorsed from his knowledge of the law and parliamentary procedure everything asked for, and thought it a right and reasonable proposition, and he had expressed himself to the effect that he could not see that either the Lord President or the Legislature generally would take exception to its provisions. Probably by the next meeting of the Council there might be something further to report on this subject. At present the Bill was waiting for the second reading, and for consideration by the Privy Council. With regard to the Early Closing Bill, he approached it with a considerable amount of delicacy, because everyone interested in the advancement of pharmacy would be only too happy to find some way by which excessive labour in pharmacy should be done away with, and opportunity given both for relaxation in the fresh air and for study. But when they considered the duty cast upon them by the Legislature and the public, they could not shut their eyes to the fact that there were difficulties in the way. The principle of the Bill was that all shops should be closed at eight o'clock on ordinary days, and at ten on one other day, presumably Saturday in most places, and that on the demand of two-thirds of the shopkeepers in a district the local authority might compel the closing of all shops, including those of pharmacists, from two o'clock in the afternoon on one day in the week. It was quite obvious that if the chemists and druggists thought it disadvantageous to be closed at two o'clock in the afternoon they might be outvoted, and therefore, they must assume that where this provision was brought into operation it would have the effect of closing chemists' shops at two o'clock. The position taken up by the Committee, which commended itself to his judgment, was this. They had in that Society and elsewhere by voluntary measures improved the position of pharmacists as principals, and the position of those who for the time being happened to be assistants. They had advocated in every way reasonable facilities for recreation and study during apprenticeship. Many round that table had been the first in London and in the country by voluntary arrangements to shorten the hours of labour. Indeed, in this Bill the author had felt his difficulty with regard to registered chemists and druggists, and he had, therefore, said that such men should not be liable to any fine under the Act for supplying medicines, drugs, or medical appliances after the hour appointed for closing, but this section was not to be deemed to authorize chemists to keep open shop after the said hour. Now, he considered all those engaged in pharmacy, as well as in many other occupations, might be divided into two classes, those who did all they could to promote the general welfare of people about them, and those who were callous, indifferent or impecunious. Now the class most difficult to deal with by any voluntary scheme for closing would have the same opportunity under this exception of doing all that they did now. The shops would be closed under the statute, but there would be a business carried on under the guise of selling medical appliances, which could not be strictly limited, and there would be just the same difficulty as now with regard to finishing work. The shutters or blinds would be down, but the business would be carried on under that exemption clause, and practically there would be one set of men conscientiously carrying out the provisions of the Act, because it was on the statute book, not because they were liable to a fine, and another set which would evade it as much as possible. He did not believe that, if the statute were passed, it would effect what was contemplated, and, therefore, he thought it better it should not be passed at all. Then came the much larger question, how far those who had been trained in a particular way by passing examinations, etc., should be interfered with in matters of this kind. They existed for the benefit of the public, and they must be at the beck and call of the public, and it was a mere question of degree whether the blinds were down or up. He thought they should accept the full responsibility of being, like medical men and others, at the service of the public at all hours of the day or night. On these grounds they claimed to be remunerated, and they must not expect, therefore, that their work could stop short at any given time. If it were possible that the public should cease to want anything they supplied from eight o'clock at night until eight the next morning, they would all be very glad to accept that position; but when the Bill implied by the exception that there must be an attendance after the prescribed hours for supplying these necessities, and inasmuch as in the majority of chemists' shops there was not a staff of assistants, he felt certain that if the Bill passed it would not relieve the assistants or apprentices, except so far as the good feeling and right-mindedness of the principal would allow him to sacrifice himself for their benefit. That being so, he said the proper way was not to interfere with the principal by enactment, but to leave him to do what he would voluntarily. In many parts of London a large part of the business was done at a time

when many people were in bed. It might be said that this could be prevented, but he did not think it could, at any rate in all towns. It must be remembered that in many neighbourhoods small quantities of remedies for the toothache, doses of castor oil, Epsom salts, and so on, very trivial from a financial point of view, but very important to the poor, were wanted very late at night or early in the morning. He had always understood that, at all events outside London, means were usually given for either a rest or recreation in the morning, or some other portion of the day. He thought if that were done it was as much as practically could be done at the present time. Under those circumstances, having regard to the fact that the exemption proposed would practically not achieve the object for which it was intended, it seemed to the Committee that the Council should take the necessary steps for getting Sir John Lubbock to exempt chemists and druggists altogether from the operation of the Act.

Mr. RADLEY seconded the motion.

Mr. HAMPSON said he was glad the Committee had decided to object to the Bill being applied to chemists and druggists, but he should have been better pleased had it objected to the Bill entirely on principle. After all it appeared to him that the purchase of a beef steak was just as important as the purchase of a black draught, and sometimes more so, and he would rather take the broad view that this kind of legislation was unnecessary altogether, and especially so as applied to the calling of chemists and druggists. It would be better almost to take that line than to ask for special exemption for their own particular calling. There was no doubt a gradual and natural tendency to early closing, and a great improvement had taken place in this respect all over the country, but it seemed unwise to bring about, by Act of Parliament, any hard and fast line with regard to the shutting of shops. The present was a time of what might be almost called cannibal competition, and those who had to struggle most required the fullest opportunity to gain their living. It would be an extraordinary hardship, especially in the East-end of London, and large manufacturing centres, where the wants of the poor were often attended to in the evening, to compel small traders to close at a particular hour. It appeared to him an unwise interference with the freedom of trade, and he should much prefer therefore to oppose the Bill on principle.

The PRESIDENT said he did not wish to stop Mr. Hampson. The view the Committee had taken was that it was stated in the press that a large number of traders in general callings wished the Bill to pass, and the members of the Committee, as chemists and druggists, though they knew their own calling, could not be supposed to know the requirements of all other trades, and therefore it was deemed wise to confine themselves to their own craft.

Mr. HAMPSON thought that chemists and druggists were intelligent enough to understand what was going on all around them. They belonged to the shop-keeping class, and knew exactly the circumstances which existed. He therefore thought the broad principle of opposition to the Bill was much better than asking for an exemption for themselves, and leaving the principle untouched as it affected other persons.

Mr. WOOLLEY said this Bill had been considered by the local association at Manchester, and those present were distinctly in favour of the Bill, provided they could not get a better Bill; their idea of an improvement was that such people as tobacconists should not be allowed to keep open. For his own part it seemed to him an interference with the liberty of the subject, which was much disregarded in these days, and it was only a little further addition to much grandmotherly government; still, at the meeting of the Manchester Association the trade was practically unanimous in favour of the Bill.

Mr. SAVAGE said there was something to be said on both sides. He had known cases where there had been perhaps three chemists in a district, two of them agreed to close at a certain time, but the other said no, and that prevented any of them closing. You could not expect any two men to close, and allow a number of those living in the neighbourhood to go to No. 3. At the same time he quite agreed in the necessity, as far as their trade was concerned, of being exempt from the operation of the Bill, though he could scarcely agree in the general view taken by Mr. Hampson. Still it was very well known that a great number objected, and a great number approved of this legislation, and he believed the majority throughout the country would be found to approve of a compulsory measure for closing, because there were always black sheep who stood in the way of reform.

Mr. RICHARDSON said the President had so fully represented the feeling of the Committee on this question that it was hardly necessary to say anything more. Mr. Hampson would admit that the Council represented the pharmacists, and he believed the butchers, bakers, and candlestick makers would also make a strong protest against the Bill, and he did not think there was a chance of its ever becoming law. In the country, especially since he had the privilege of being an apprentice and a chemist in the open shop, rapid strides had been made in the interests both of apprentices and assistants. When he was an apprentice he had to commence at eight o'clock in the morning and keep on until nine, and sometimes ten at night, and on Saturday till twelve. That practice did not exist very much now. In Leicester most shops closed at eight, and on Thursdays at two o'clock. Years ago that was never dreamt of. Labour was less in every walk of life than it was ten or twenty years ago. The gentleman who brought forward this measure in the interests of traders could not know the immense strides that had been made. He had no doubt that in close premises there was a great deal of hardship, but he thought the more dignified course for the Council to take would be to object to the Bill in the interests of chemists and druggists, leaving it to other trades to oppose it on their own account.

Mr. HILLS thought it was hardly necessary to add anything to the remarks made by the President, but he could corroborate what had been said by him and by Mr. Richardson. He was utterly opposed to the principle of the Bill and entirely agreed with Mr. Hampson. There appeared to be a great difference of opinion amongst the pharmaceutical chemists and the chemists and druggists, and that being the case he thought the wisest thing for the Council to do would be to adopt the recommendation of the Committee. If there were any other opportunity for assisting shopkeepers generally to oppose the Bill he should be happy to join in doing so, but even if the Bill passed he did not think it would be worth the paper it was printed on.

Mr. ATKINS agreed as to the desirability of exempting chemists from the provisions of the Bill, but at the same time he thought there was a great deal to be said on the other side of the question with regard to its general policy. That, however, was not before the Council. No doubt the general traders and the public would take care of their own interests, and it was hardly necessary to say a word more after the complete way in which the President had put the case. He noticed the President did not commit himself to any opposition to the Bill on general principles, and when one looked at the names on the back of the Bill, including not only Sir John Lubbock, who had given the country a great boon in the Bank Holiday Act which was highly appreciated, but other representative men on both sides of the House connected with labour and with finance, he hoped that while for the reasons which have been so well expressed chemists and druggists would be exempted from this Bill, the Council would not go further and oppose the general principle.

Mr. RICHARDSON asked if public houses were to be closed.

The PRESIDENT said no, nor newsagents. The exemptions were at the end of the Bill.

Mr. ROBBINS said some time ago he was asked to sign a paper saying whether he approved of the Bill or not. He at once said it looked very much like grandmotherly government, which he did not like, but the principle the author sought to carry out was certainly very desirable. The movement in favour of early closing commenced many years ago, and it had gone on, and this was simply carrying out by Act of Parliament what was being carried out individually. It seemed to him, therefore, there was no necessity for the Bill. Mr. Woolley said that at Manchester the chemists were in favour of it, and Mr. Richardson said they already carried out in Leicester everything proposed in the Bill, so it appeared as if they liked to be good, and did not like to be forced to be good. It seemed to him it would be rather awkward if the chemists in other towns met and approved of the Bill, as they had in Manchester, and the Council opposed it. He could not say he approved of the Bill, though he approved of its object.

Mr. SYMES said he should support the recommendation of the Committee. He had always been a strong advocate of early closing, but he advocated it voluntarily. He failed utterly to see why the shops that vended luxuries such as tobacco should be allowed to remain open whilst those of chemists and druggists were obliged to close. Looking at the exempting clause, it certainly appeared at first sight that it would serve their purpose, but they all knew from experience that it was difficult to draw the line as to what was a medicine absolutely required. A person might want a bottle of medicine and a bottle of eau de cologne—one to be taken internally, and the other to be applied externally, say for a headache. But there was an evil beyond that; there were certain exemptions, such as tobacconists and newsagents, and if the public failed to be supplied with the drugs that they required in the chemist's shop these people would take to supplying them if they were outside the provisions of the Pharmacy Act, and that seemed to him a very serious matter. He thought the Bill utterly unnecessary. When he commenced business he closed at eight, notwithstanding there were twenty shops around him who kept open till nine, and he believed it did him good rather than harm. He would support the Committee strongly, and should be happy to do anything he could in his own locality, in regard to interviewing members of Parliament and otherwise, that would assist in obtaining the exemption asked for.

Mr. SOUTHALL thought it seemed a little strange for the Council to oppose this Bill for closing shops at a reasonable time seeing that chemists and druggists would have the liberty of selling anything which the public could really require. By closing their shops they only intimated to the public that they did not want to trade after eight o'clock, but they kept a night bell and were ready at any time to supply medicines. They had a Bill for education now before Parliament, which they hoped would get through, and if they were to give young men extra education they must certainly endeavour to shorten the hours of business as much as possible; and this Bill gave them the opportunity of doing so. Perhaps those who lived in the middle of a town did not need it, but those who lived in the outskirts did require a little help such as this Bill could give them in order to give them the courage they required to put up their shutters. He believed it was a great advantage to go in for early closing, and that suburban chemists would not suffer by it any more than those in the centre of a town. He hoped, therefore, the opposition would not be proceeded with.

Mr. ALLEN said he, like Mr. Atkins, should have had something to say on another side of this question, were it not that it seemed to him that the whole necessity for the Bill was taken away by an Act which came into operation in November of last year, but which seemed to have already fallen dead. He referred to the Shop Hours Regulation Bill, by which it was enacted that no young person under the age of eighteen should be employed in a shop for more than seventy-four hours per week. He could not understand, in this century at any rate, why Parliament should by any enactment interfere with the hours of labour of men and women; it seemed to him an improper interference with the liberty of the subject.

Mr. WILLIAMS said he did what he could to persuade the Committee to oppose the Bill entirely and on principle, for he had a great horror of anything like coercive legislation, unless it were absolutely essential to the safety of the people at large. Such measures should be had recourse to in the last resort only, not in the first, and therefore he entirely disagreed with the attempt to bring about even a good result by coercive means. The members of the Committee, however, came to the conclusion that it would be better to limit themselves to the considerations which affected their own body, and this was perhaps, on the whole, the wisest course to adopt.

The PRESIDENT said there seemed to be a general feeling, except on the part of Mr. Southall, in favour of the soundness of the conclusion arrived at by the Committee, and he would therefore confine himself to Mr. Southall's observations. He thought Mr. Southall looked at the matter from the point of view of an old historic house with a large staff. He did not know Birmingham very well, but he should imagine there were a number of people who were employed in Birmingham until eight o'clock; that they then went to the suburbs, and there they had to get the things which they had not time to get in the day; they must either get them very early in the morning, or after eight o'clock at night. The result was that legislation for the centre of a town was not suitable for the outskirts; what suited London did not suit other parts of the country. The average chemist and druggist simply thought he should be compelled to shut up, and he said "a good job too." But it would not be so; the shop would be shut up by statute, but the door might be open, and those who took a lax view of moral duty would go on trading vigorously under the exemption. He could take Mr Southall to places in London where a roaring business was done on Sundays, and on other days up to twelve o'clock at night, although the shop was shut up. He did not know whether the places belonged to chemists or medical men, but they were generally known as chemists' shops. You could not by any form of statute reach individuals who cared nothing for those about them, and he feared their friends were misled if they thought they were going to be taken in hand by some superior power which should make all do alike. Early closing was an individual question; every man who had any backbone could shut early if he liked, and did not want anybody to help him. When they had complaints by assistants in some houses where they were overworked, and heard of the desirability of forming a shop-hours league, to be composed solely of assistants in various trades for the purpose of coercing employers to fix certain hours, he would like to remind them of a case within his own knowledge. Some twenty years ago several members of the Council residing in London agreed that greater opportunities for study should be given to their young men, and a great many houses in a certain part of London were thenceforward closed partially at seven, and entirely at eight o'clock, and he knew of one house at least which was shut completely at seven. Now he knew a case in a street where no business of any general kind was done after seven o'clock, in which a young chemist (who not long ago was an assistant in a historic house, and of course was then a strong advocate for early closing) had started in business, and he thought it right to keep his shop well illuminated until twelve o'clock at night, and partially on Sundays. He was within a stone's throw

of several of those houses which had been doing all they could for their people for the last twenty years, but none of them would like to go and ask Parliament to compel that man to shut up. They said no, he may have a hard struggle to get a living, and he must be allowed to try in his own way. It seemed to him altogether unwise on general grounds to interfere in this matter, but the great objection which the Council had to this Bill was that it would not give the leisure and the freedom from worry and anxiety which was expected; the smallest firms as well as the largest would have to keep a representative or some one in the shop to supply medical appliances, and that being so, it was impossible by legislation to benefit the craft with regard to the actual hours of keeping open shop.

The motion was then carried.

GENERAL PURPOSES.

The report of this Committee, which was as usual read in Committee, included the usual letter from the Solicitor, stating the progress made with cases placed in his hands.

The resolution passed by the Sheffield Pharmaceutical and Chemical Society on January 12 had been considered, and it was recommended that the Society be informed that the case referred to was not one in which it was desirable to institute proceedings.

A communication addressed to the Council by a rejected candidate at a recent examination at Edinburgh had been considered, and it was recommended that the writer be informed that the Council had no power to interfere with the decision of the Board of Examiners.

On resuming, the report and recommendations were unanimously agreed to on the motion of the PRESIDENT.

THE ANNUAL REPORT.

The preparation of the Annual Report was referred to the Library and Museum Committee.

It was resolved that the Annual General Meeting be held on Wednesday, May 18, at twelve o'clock.

REPORT OF EXAMINATIONS.

February, 1887.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (22nd)	7	4	3
„ (23rd)	7	3	4
	—14	—7	—7
Minor (22nd) . . .	29	11	18
„ (23rd)	27	11	16
„ (24th)	31	18	13
„ (25th)	30	13	17
	—117	—53	—64
Modified (25th) . . .	1	0	1
	132	60	72

Preliminary Examination.

Five certificates were received in lieu of the Society's Examination :—

2 University of Cambridge.
1 „ „ Glasgow.
1 „ „ Oxford.
1 Incorporated Law Society.

THE IMPERIAL INSTITUTE.

The PRESIDENT read the following letter which had been received from Sir F. Abel :—

"Imperial Institute of the United Kingdom,
the Colonies and India.
"1, Adam Street, Adelphi, London, W.C.
"*February* 7, 1887.

"Sir,—I have received the instructions of His Royal Highness the Prince of Wales to submit to you the request that you will be so good as to inform the Council of the Pharmaceutical Society of the hope entertained by His Royal Highness that they will feel disposed to invite the members to take part in the foundation of the Imperial Institute of the United Kingdom, the Colonies and India, which is being established in commemoration of the fiftieth year of the Queen's reign.

"The Prince of Wales feels sure that those whose profession, and whose interest in its advancement, are intimately interwoven with their devotion to the cultivation of those branches of science upon which its exalted position and inestimable benefit to the world at large are based, cannot fail to have the warmest sympathy for the realization of the measures included in the admirable scheme for the Imperial Institute which has been prepared by the Committee appointed by the Prince of Wales.

"That scheme has received the special approval of Her Majesty, as constituting a fitting and most acceptable monument of the respect and affection entertained for her by her subjects, and of her constant desire to promote any public movement having for its object the intellectual and natural advancement of every class and race of her people, and the promotion of the unity of her empire.

"Should your Council be willing to appeal to your members to transmit through you donations to the fund required for the establishment of the Imperial Institute the Pharmaceutical Society would become directly identified with this national tribute to the Queen on the occasion of her Jubilee.

"I beg leave to enclose a pamphlet descriptive of the nature and objects of the Institute, and shall be glad to give directions for the transmission to the Society of this and other papers for distribution among the members should the suggestion of His Royal Highness be favourably entertained by yourself and your Council.

"I have the honour to be,
"Your obedient servant,
(Signed) "F. A. ABEL,
"*Organizing Secretary.*

"The President of the Pharmaceutical
Society of Great Britain,
"17, Bloomsbury Square, W.C."

The PRESIDENT then moved :—

"That the Library, Museum, Laboratory and House Committee be requested to take such steps as may be deemed desirable to carry out the request contained in the letter from Sir F. Abel, dated February 7."

Mr. ATKINS feared the special appeal the Council was about to make on behalf of the Benevolent Fund would interfere with any large response to this appeal. It should also be remembered that appeals were being made all over the country on behalf of the Imperial Institute, and he would therefore recommend that too much should not be made of this appeal, seeing that many of their members were already dealing with it individually. He should not send out a special circular, but should be content to insert a letter in the Journal. The Council had been doing all it could in the way of granting annuities, hoping to recoup the Fund by means of the special appeal about to be made; and therefore he was not in favonr of pressing the claim of the Imperial Institute beyond, perhaps, calling attention to it in a short editorial article.

Mr. SCHACHT thought this communication should be courteously acknowledged, but he thought it would be unwise for the Society to open a special fund for the Imperial Institute. He thought the answer to the letter should be that every publicity should be given to the letter, and he saw no objection to placing a copy in the hands of all the members, but that the members being distributed all over the country would probably prefer to give their contributions in their own neighbourhood, and therefore the Council thought it would be unwise to ask for special donations to a central fund.

Mr. ATKINS hoped Mr. Schacht would not ask for a copy of the letter to be sent to every member. He

thought the publication in the Journal would be quite sufficient.

Mr. SCHACHT said he had no strong opinion about that. But he should strongly oppose a special fund being opened.

Mr. RICHARDSON said that it would be very absurd if the Council were to go to the expense of distributing these documents to the whole of the craft; it would be quite sufficient if the letter were published as part of the day's proceedings, and if the President liked to head the subscription with 100 guineas no doubt many others would prefer to send their subscriptions through the Society instead of through any local channel. In his own town there was a great difference of opinion whether they should support the local list, or send their subscriptions direct on through some central body such as the Society of Arts. One gentleman had intimated that he should give £500, but he would not have it included in the Leicester list, and was going to send it to London on his own account. Some might prefer to contribute through the Pharmaceutical Society, but he should be very sorry to do anything which could be in any way antagonistic to the Benevolent Fund.

Mr. ALLEN endorsed the view that publication in the Journal would be sufficient, without sending an individual appeal to each member. Some few months ago the President jokingly remarked that the establishment of the Research Laboratory would be a fitting celebration of the Queen's Jubilee, and it really appeared to him that there was a good deal of truth in that. The Colonial Exhibition brought the Society in touch with a great many gentlemen from India and the Colonies, and it was quite evident that they found in the Society a considerable amount of help in the work they were carrying on, and hoped to carry on in future. With a research laboratory established, there would be a further aid to their work, and a still closer bond of connection between them. Such an institution must of necessity be an adjunct to the Imperial Institute, in fact, it was understood that there were to be laboratories in connection with the Institute; but in Bloomsbury Square, there would be a definite scheme which would be worked out by men thoroughly acquainted with every technicality connected with it.

Mr. SAVAGE said every town and village was being appealed to for the Imperial Institute, and many persons were getting thoroughly sick of it. At Brighton the Mayor had been appealed to; several meetings had been held and subscriptions were invited, seventy per cent. of which were to go to the Imperial Institute and the remainder to a Free Library and other things. He feared the President would have hardly anyone to appeal to except those who were already bound to subscribe elsewhere.

Mr. WILLIAMS reminded the Council of the wording of the letter, which asked if it would be willing to appeal to the members to transmit donations, so that the Society might become directly identified with this national tribute. He did not think the view taken by Mr. Allen had any bearing on the question; if carried to a logical sequence the Council would have to reply that it had already formed its own view as to the manner of celebrating the Jubilee. But that would be hardly correct, because there was no thought of the Jubilee when the Council commenced the work. He did not think a mere publication of the letter in the Journal would meet the case; but the other document referred to ought to be put before the members, and then if anyone chose to send his subscription through the Society he could do so. As far as he was concerned he had already subscribed and could not do so again, the three Chemical Societies having combined together to raise a fund.

Mr. ROBBINS said the Council was asked by the letter to do something, which it could either do or not, but it must decide at once which course to take. He was quite sure that Sir F. Abel would prefer the Council doing nothing to simply publishing his letter in the Journal. A treasurer must be appointed, and people must be told where to send their money. It would be very awkward to create all this machinery, and then have only a very trifling sum to hand over. It might be said it was not politic for certain reasons to move in the matter at all; but if anything were done, an effort should be made to send in a respectable sum on behalf of the Society.

Mr. HILLS thought if the appeal were published in the Journal, with a small leader calling attention to it, it would be far better than sending out a pamphlet specially such as every one was inundated with. The Council was only asked to appeal to the members, which it might fairly do through the Journal, and very likely a fair amount might be collected, which the Society need not be ashamed of, without any undue pressure.

Mr. HAMPSON said he did not quite understand what the Imperial Institute was, and, therefore, he could not recommend his fellow-members to subscribe to it. If they thought fit to send in money for this particular purpose, about which so little was known, he would much rather they should do it, individually, in their own localities; for he did not want the Council to take the responsibility of recommending this scheme. He was extremely glad, as they all were, that Her Majesty had lived so long; but if it was necessary to establish some great institution, it was also necessary to know where it was to be placed. There was a very great difference of opinion as to its utility, and he certainly felt indisposed to do anything towards furthering this scheme in any way whatever.

Mr. CROSS, as a loyal subject of Her Majesty, was obliged to differ from Mr. Hampson, and he should be sorry if the Pharmaceutical Society, when appealed to in its corporate capacity to further an object which was ardently supported by the heir to the throne, and which had the sanction and hearty approval of Her Majesty, should put it aside. He thought the Committee was perfectly qualified to deal with the matter, and having heard that discussion would know pretty well what were the wishes of the Council in the matter.

Mr. SOUTHALL supported the motion.

Mr. SCHACHT was not quite clear even now what was intended to be done by the Committee, and was inclined to move an amendment to the effect that a communication should be addressed to Sir F. Abel informing him that it was not deemed desirable to open a special fund for this purpose, but that the Council would be happy to do anything in its power to make the Imperial Institute known to the members of the Society, who, being distributed throughout the country, were many of them known to be already interested in local subscriptions for this purpose.

Mr. ATKINS said he should be glad to second the amendment, but he did not think it necessary, as he understood the Committee would have full power to deal with the matter.

The PRESIDENT said the motion referred the subject to the Committee to carry out the request contained in the letter.

Mr. ATKINS said he thought the Committee could do what it saw fit in the matter.

Mr. SCHACHT said he wished to bind the Committee not to invite subscriptions to a special fund.

Mr. ATKINS said he had already in his own town subscribed to the Imperial Institute, and he could not give another subscription through the Pharmaceutical Society. He had been applied to by three organizations already.

Mr. ROBBINS said he should have a number of applications from different societies also, but he should prefer to send his subscription through the Pharmaceutical Society.

In answer to a question, the PRESIDENT said if the motion were carried the Council would be bound to issue a circular and open a fund.

Mr. HILLS thought it would be a pity to have a division on this question, but the spirit of the request might be carried out without sending out a number of

pamphlets all over the country. He should prefer to subscribe as a pharmaceutical chemist rather than in any other capacity. No doubt many others would have the same feeling.

Mr. RICHARDSON was opposed to any money being spent in advertising this appeal, but he thought the subject need not be referred to the Committee at all. The Council might decide at once to open a fund.

Mr. SCHACHT suggested that it would only tend to injure local efforts. London chemists might have a fund of their own, if they liked, but they did not know the amount of pressure which was brought to bear in the country.

The PRESIDENT said he could not help thinking that Mr. Schacht had somewhat misunderstood the terms of the letter, and he was also mistaken in supposing that Londoners had not as many appeals as those living in the country. The Council had been asked to put this before the members, and could it refuse to do so?

Mr. SCHACHT: No.

The PRESIDENT said then the only objection was to opening a special fund. On the other hand, all the other learned societies having been appealed to, it might have been considered as a slight if the Pharmaceutical Society were not treated in the same way. He thought the matter should be dealt with in a business way, putting the invitation before the members, but exercising no pressure of any kind, and leaving it to the Committee to decide how it should be done.

After some further discussion the motion was put and carried, with two dissentients.

THE BENEVOLENT FUND.

The PRESIDENT said it might be as well in view of the resolution just passed to take the opinion of the Council whether it would be advisable to push forward the appeal for the Benevolent Fund this year, as already arranged. It was a question with many whether these Jubilee funds would not interfere with the success of their efforts.

Mr. WILLIAMS thought the annuitants would not consider it much of a Jubilee if their supplies were cut off.

Mr. ATKINS thought the Council had better go on and do the best it could.

It was therefore agreed that the arrangement made last month for the holding of the Benevolent Fund Dinner in May next should be carried out.

Mr. BOTTLE called the attention of the Council to the report in the last issue of the Journal of a meeting of the Leicester Chemists' Association, in which the president of that Association was reported—he hoped inaccurately—to have said that he denied the right of a few West-end chemists to speak for the trade at large, as they did not understand the views and requirements of provincial pharmacists. It appeared to him that that was a libel on the President and the members of the Council resident in London. No other West-end chemists had assumed any right to speak for the trade at large, and it was not only the right but the duty of the Council to give expression to the views and wants of the trade. During the thirty years he had had the honour of a seat at that Board, he had invariably found the London chemists had been as well posted in the wants of provincial pharmacists as he was himself, and that they had as much sympathy for those wants. He hoped Mr. Richardson would be able to put some other interpretation on the report and would invite him to do so.

Mr. RICHARDSON said the report in question was sent by the hon. secretary of the Society in Leicester, a very active member, who did not write shorthand, and must have prepared it mainly from memory; but he was not going to deny the substantial accuracy of what was stated, though no doubt if the whole of his remarks had been reported verbatim, there would have been a good deal which might at any rate palliate what seemed a little offensive towards the chemists of London. He was not the first person who had said publicly that the London chemists did not know the requirements of the country pharmacists; but he was free to confess, after the admirable speech they had heard that morning from the President on the Early Closing Bill, that he at any rate had a most intimate knowledge of those requirements. He was quite converted with regard to the President, and should be happy to contradict what he had said at Leicester, but he would not go so far as to say that all West end pharmacists had the same perfect knowledge. With reference to the President he confessed his error, and begged his pardon. With regard to other gentlemen—he said it out of no disrespect to them, for he esteemed them highly; but it was the grand principle of the Society that every portion of pharmacy should be represented at that Board, and he hoped that out of this large store of varied knowledge the best results for the whole would result. He hoped this explanation would be satisfactory to his friend Mr. Bottle, whom they all looked up to as a guide; he should be very sorry to say a word which would cause him the slightest pain, and if he had he would withdraw it at once.

EXAMINATIONS IN LONDON.

February 22, 23, 24 and 25, 1887.

Present—22*nd.*—Mr. Carteighe, President; Mr. Gostling, Vice-President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner and Thresh.

23*rd* and 24*th.*—Mr. Carteighe, President; Mr. Gostling, Vice-President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner, Taylor and Thresh.

25*th.*—Mr. Carteighe, President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner, Taylor and Thresh.

Dr. Greenhow was present on the 22nd and 24th on behalf of the Privy Council.

MAJOR EXAMINATION.

22*nd.*—*Seven* candidates were examined. *Three* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Barnes, William Robert .....Plaistow.
Bury, James Edward .....Evesham.
Parkinson, William.....London.
Puckey, William .....Bishop's Stortford.

23*rd.*—*Seven* candidates were examined. *Three* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Edwards, Alfred Egbert .....London.
Stark, Arthur Campbell .....Norwich.
Wood, Arthur William .....London.

MINOR EXAMINATION.

22*nd.*—*Twenty-nine* candidates were examined. *Eighteen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Bennett, Arthur .....Widnes.
Bond, Ernest Greensill .....Liverpool.
Calvert, Albert Matheson .....Belper.
Carpenter, Frederick Ernest ...Cirencester.
Clark, William Alfred.....Southampton.
Clayton, John .....Scorton.
Coles, Arthur .....Uxbridge.
Collins, Alfred .....Bradford.
Couzens, Albert Ebenezer .....Westbury.
Crossling, Frank .....Newcastle-on-Tyne.
Dawson, Edwin .....Stamford.

23*th.*—*Twenty-seven* candidates were examined. *Sixteen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Elsdon, Herbert William .....Wells.
Emerson, Richard Wm. James.Hull.
Felton, William .....Maidstone.
Flint, Richard .....Loughborough.
Forbes, Alexander .....Fraserburgh.
Foulkes, Edward James.....Whitchurch.
Gourlay, Henry Hamilton .....Lytham.
Green, Herbert.....Hucknall Torkard.
Gwillim, Walter Robert .....Abergavenny.
Hamer, Edward Sidebottom ...Pendleton.
Harries, David .....Carmarthen.

24*th.*—*Thirty-one* candidates were examined. *Thirteen* failed. The undermentioned *eighteen* passed, and were declared qualified to be registered as Chemists and Druggists :—

Harwood, Henry Webster .....Portsmouth.
Heaton, Simon Wood .....Leeds.
Hildyard, William .....Woodbridge.
Hill, Ernest Victor .....Walthamstow.
Hine, Alfred Ernest .....Beaminster.
Hobson, Edmund.....Cheadle.
Jenkins, John Lewis .....St. Clears.
Jones, Maurice Howell .....Machynlleth.
Kneale, James Coole .....Douglas.
Lamplough, James William ...London.
Lance, Henry .....Bow.
Lawrence, Arther Frederick ...Cambridge.
Milner, Henry Robert.....Doncaster.
Page, William Armstrong .....Ironbridge.
Parish, William .....Cleator Moor.
Paul, Henry Stanley .....Birmingham.
Thomas, John .....Oswestry.
Young, Edward .....Sudbury.

25*th.*—*Thirty* candidates were examined. *Seventeen* failed. The undermentioned *thirteen* passed, and were declared qualified to be registered as Chemists and Druggists :—

Sinclair, William Austin.....Leamington.
Sowden, Joseph.....Bowling.
Templeman, George.....Southwell.
Thomas, Isaac Jenkin.....Aberavon.
Thompson, Henry Edward.....Sheffield.
Turner, Harold Strange .....Winchester.
Upson, Arthur .....Southampton.
Waddington, Alfred Henry ...Bradford.
Walden, Henry Ernest .....Southampton.
Wallis, Philip James .....Wellingborough.
Walshaw, Richard Carnelly ...Wakefield.
Walters, James Lewis.....Burry Port.
Wilson, Joseph.....Bradford.

MODIFIED EXAMINATION.

25*th.*—*One* candidate was examined, but failed.

PRELIMINARY EXAMINATION.

25*th.*—Certificates by approved examining boards were received from the undermentioned in lieu of the Society's examination :—

Atkinson, Alfred .....Bishopton Mills.
Crawford, David ....Rutherglen.
Smith, Rowland Roche .....Tenby.
Tovey, Arthur John Henry ...Doncaster.
West, David Dudley .....London.

Proceedings of Societies in London.

ROYAL INSTITUTION.

Sunlight Colours.

A large and interested audience was present at the Royal Institution on the 25th ult. to hear a lecture on "Sunlight Colours," delivered by Captain W. de W. Abney. The lecturer commenced by exhibiting some recent improvements in instruments for measuring coloured rays, introduced by General Festing and himself. A ray of electric light of definite intensity is intercepted by a prism and made to throw its spectrum upon a screen. Any part of this spectrum can be completely cut off at the will of the operator by passing the decomposed ray through an instrument provided with a sliding scale, the structure of which was explained by the lecturer. Thus by a suitable adjustment of the sliding scale, any single required colour can be allowed to fall upon the screen and constitutes the standard for examination in that particular colour. If a ray of light from any source be placed under examination in order to ascertain the amount of a certain colour it manifests, it is only necessary to cause two shadows to be thrown upon the screen respectively by the standard ray and the ray under examination, and then to regulate the intensity of the latter until the two shadows are identical. This regulation is effected by obstructing the course of the ray by means of a disc provided with movable fans, revolving at right angles to its path, the intensity of the light thrown upon the screen being altered by increasing or diminishing the space between the fans. Further, by means of the same instrument, Captain Abney has not only found that most persons show some deficiency in their capabilities for colour perception—that is to say, are more or less colour-blind—but he has also, by making experimental tests in each colour, constructed curves showing the capabilities of individuals in this respect. Curiously enough the lecturer stated that General Festing and himself had identically equal powers of distinguishing colours and had not been able to find anyone possessing higher capabilities. Captain Abney therefore proposed to designate the curve representing their power of perception, the normal curve. A great number of persons tested by Captain Abney have been pronounced by him deficient, several prominent artists having been found to possess two-thirds of the normal colour perception, whilst other individuals only possessed one-half or even one-third. This deficiency was most marked in the red colours. The lecturer then referred to the statement made last year by Lord Rayleigh, to the effect that in turbid mediums red rays are transmitted better than blue rays. Professor Tyndall has brought forward the same idea in his theory of the formation of the blue colour of the sky, by stating that any fine particles in the air scatter and reflect more blue light than red light. An experiment shown by Captain Abney in his lecture, however, is the best illustration of this fact yet exhibited to an audience. A ray of decomposed light was made to pass through a vessel containing a clear solution of hyposulphite of soda before being projected upon a screen. Upon the addition of hydrochloric acid to the hyposulphite of soda solution, a fine deposit of sulphur began to form, and simultaneously with its initial formation, the blue end of the spectrum disappeared. As the deposit of sulphur increased in density, the other parts of the spectrum adjacent to the blue began to disappear, until finally only the red band of the spectrum was distinguishable. Turning then to matters more directly connected with the title of his lecture, Captain Abney explained the blue haze over distant landscape to be due to the partial obstruction of the blue rays by minute particles in the air. This haze is very noticeable in England, where moisture is nearly always present in the atmosphere, either as vapour or in fine particles of water, but in Egypt or the High Alps, the lecturer stated, there was no such appearance. In the former country the absence of the phenomenon is no doubt due to the absence of moisture owing to the intense heat and nature of the country; but in the latter regions Captain Abney considered it due to the fact that the particles, having a greater density than air, sank to the lower regions, leaving the atmosphere of higher altitudes comparatively devoid of them. Another proof of the greater transmitting power of red rays in turbid mediums was pointed out by the lecturer in the appearance of the vista of lamps in long London streets lately, where, owing to the presence of some amount of fog, the apparent colour of the lamps ranged from a yellow tinge

with the nearest, to a reddish-yellow with more distant ones, and even, according to Captain Abney, to a scarlet colour. A series of photographs were then projected upon a screen, and Captain Abney pointed out that in those taken at low altitudes objects in the distance were indistinct, and the shadows not very marked, but that as higher altitudes were reached distant landscape became much more distinct and appeared nearer, whilst shadows became very definite, causing a remarkable disappearance of intermediate tints. In concluding, the lecturer made some remarks which rather discredited the results arrived at as to the colour of the sun by the observations of Professor Langley, which were embodied in a lecture before the Royal Institution last year. Although the figures given by Professor Langley apparently show a large preponderance of blue rays in sunlight, yet Captain Abney assured his hearers that even allowing these figures to be correct the amount would scarcely give a blue tinge to the sun's rays. Still, the fact that the turbid state of the earth's atmosphere does seriously affect the transmission of blue rays from the sun is evident from Captain Abney's statement that sunlight at South Kensington last December only contained one-twentieth the amount of blue rays observed in sunshine on the Riffel the previous September. The lecturer caused a pleasurable surprise at the close of his lecture by the imitation, on a minute scale, of the setting sun. Having explained that although the sun, when at an angle of 50° to its zenith passed through what was equivalent to 1·5 thicknesses of the earth's atmosphere, yet at an angle of 85° it passed through 9·2 thicknesses, and at 90° through 35·5 thicknesses of atmosphere, he pointed out that the nearer the sun approached the horizon the greater would be the exclusion of all the rays except the red, which caused the noticeable appearance of the sun at the horizon. An intense ray of electric light passed through a gradually thickening medium exhibited very well the marked gradation of the sun's change from a yellow to a bright red at sunset.

Provincial Transactions.

MANCHESTER PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held in the Materia Medica Museum of the Owens College, on Thursday evening, February 24, Mr. W. Lane, Vice-President, in the chair.

Mr. W. Elborne gave an interesting demonstration on "Some Drugs and Specimens from the Colonial Exhibition of Special Interest to Students." The lecture was demonstrated from the following specimens:—A log of *Guaiacum officinale*, showing the duramen or heart wood and resin exuding from the same, from Jamaica. A log of camphor wood (probably *Dryobalanops Camphora*), the source of Borneo camphor. Logs of yellow sandal wood (*Santalum album*), and of *Santalum Yasi*, the latter from the Fiji Court. A log of red sandal wood, *Pterocarpus santalinus*, nat. ord., Leguminosæ. Logs of cultivated *Cinchona officinalis* and of *C. succirubra*, showing longitudinal incisions in the bark, illustrative of the method of cultivation known as the "mossing" system. Perfect fruits of *Theobroma cacao* and of *Coffea arabica*, together with the dried seeds of the same. Nutmeg fruits incised in such a manner as to show in the interior the mace and testa of the seed. Some unusually fine fruits of *Cassia fistula*, *Ægle Marmelos*, *Ricinus communis*, and of *Gossypium barbadense*.

At the close of the lecture an interesting discussion ensued, in which the Chairman, Messrs. Husband, Wilkinson and Wilson took part.

Mr. Elborne having replied, the business of the meeting concluded.

The next, the "Annual General Meeting," was announced for March 24th.

TORQUAY CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held on February 23, Mr. T. Ness occupying the chair. There was a good attendance.

It was announced that Mr. A. Hoare had been placed first in the Curriculum Essay Competition.

Mr. Aplin read a paper on the Minor examination, treating the subject under four headings:—(1) When to commence study, (2) How and what to study, (3) Schools as aids to study, (4) The examination itself. The time to commence study was declared to be the same as that at which dusting was commenced; a good idea of treating the various subjects was given. Schools of pharmacy were shown to be useful as aids, as they offered facilities which were not always present in chemists' shops. Students were advised not to view the examination with alarm, or the examiners with mistrust, but to work steadily and honestly, as by so doing they had nothing to fear.

Mr. W. Smith proposed a vote of thanks to the essayist, and endorsed the chief points of the paper. Mr. Fooks seconded.

Mr. F. March while adding his testimony, offered criticisms to several details.

A vote of thanks to the Chairman terminated the meeting.

Parliamentary and Law Proceedings.

Prosecution under the Pharmacy Act.

IMPORTANT DECISION.

The case of Richard Bremridge *versus* William Baillie, touching an infringement of the 15th section of the Pharmacy Act, 1868, was heard before Sheriff Rutherfurd, in the Sheriff Court House, George IV. Bridge, Edinburgh, on Friday, February 18, at 11 a.m.

Mr. P. Morison, S.S.C., agent for Pursuer; Mr. A. J. Young, Counsel for Defender, instructed by Messrs. Liddle and Lawson, S.S.C.

The Sheriff (to Respondent): Have you a copy of the complaint?

Respondent: Yes.

Mr. Young: Before he is asked to plead I wish to take exception to the form of this complaint. As your lordship observes, it charges an offence under the Pharmacy Act of 1868, or, rather I ought to say it does not charge an offence under the statute, but simply what is said to be an offence against the 15th section of that statute——

The Sheriff: "Within the meaning of the 15th section."

Mr. Young: The complaint bears that William Baillie, residing at 12, Abbotsford Crescent, Edinburgh, has been guilty of an offence within the meaning of the 15th section of the Pharmacy Act, 1868. Now I draw your lordship's attention to this matter, that the 15th section of the Pharmacy Act does not constitute an offence. The offence is constituted by section 1 of the statute; section 15 provides for its punishment. My first contention, therefore, is that the complaint does not libel the section of the Act which creates the offence, but simply that which provides the penalty, and accordingly is deficient in the grounds upon which it proceeds. In the ordinary case, as your lordship knows, where a complaint of this kind is made, the terms of it are usually couched thus—that so and so has been guilty of an offence against such and such a statute, and the particular sections—it may be one and fifteen—thereof. Here what is founded upon in this complaint is simply section 15, which provides a certain penalty in the event of the party being guilty of the offence created by another section of the statute not referred to at all here. Now that, I would submit, is a good objection to the complaint in its present form. But I go further, and point out what I consider to be——

The Sheriff: It is a perfectly good objection, providing the 15th section does not constitute a substantive offence.

Mr. Young: Your lordship will find in the previous reports—not the last report—the case of the Pharmaceutical Society *v.* The London and Provincial Supply Association, in which Lord Bramwell, a man of eminence in London, expressly refers to section 1 and section 15 as constituting the offence and providing the punishment. It is not section 15 which introduces the offence complained of now.

The Sheriff: So far as this complaint is concerned I must read the Act as if section 1 were not there at all; and the question is whether I can go upon this complaint.

Mr. Young: I maintain, and I maintain it particularly, that the complaint is therefore not well-founded, being rested only upon a section which does not create the offence, but which simply provides the penalty. Mark, my lord, there is in the Act a section creating the offence. Section 15 was not introduced for that purpose. Section 1 had already constituted the offence. And what was the meaning of section 15? Simply that it should provide a way by which the offence introduced by section 1 should be met and punished. Accordingly, I do not look upon section 15, and I do not see how anyone can, as truly constituting the offence that is made the matter of this complaint. Now, my lord, I have another objection which I think is good. There is on the face of this complaint what appears to me a bad blot, in respect that while you have in truth only one offence here two offences are charged.

Mr. Morison: I may say I do not mean to ask for a conviction on the second.

The Sheriff: You mean there are two counts in the complaint, founded on one and the same Act.

Mr. Morison: I admit that that is bad.

The Sheriff: I go so far with you, Mr. Young, that there could not be a conviction upon both of these; it is possible there may be upon either.

Mr. Young: No; I think it would be impossible for your lordship to find cumulatively that the accused has been guilty, as the complaint avers, of two offences in respect of which he has incurred the liability to two penalties. That is what the prayer, as your lordship will see, asks your lordship to do—"one or both"—and to adjudge him to suffer the penalties provided by the said Act.

The Sheriff: I cannot convict him on both. I am quite prepared to hold that there cannot be a double penalty for the same act, and Mr. Morison admits that.

Mr. Young: Not for the same offence.

The Sheriff: For the same act. The same act might be libelled as an offence under two different sections of the statute.

Mr. Young: We are under one.

The Sheriff: Or two different parts of the same section, which is the same thing. You understand what I mean, and of course I could not find that for the same act the party was liable in a double penalty under the same enactment. That is quite clear.

Mr. Young: But this is not one act which is capable of being charged under two names. It is not one act which you can split up into two so as to make it form the ground of two charges. Lord Selborne, who was Lord Chancellor some years ago, said, as your lordship will find in regard to this matter in the case I have again to refer to——

The Sheriff: I have it here.

Mr. Young: Then if your lordship will just look at the fifth volume English Appeal Cases, p. 866, there is a sentence which contains, I think, the kernel of my statement on this matter. Your lordship will see these words—"Keeping shop is prohibited, not as a thing apart from, but as a thing involving the particular acts of sale and compounding within the shop." What I draw your lordship's attention to is this, that the offence under the statute, therefore, according to the best authority, is truly one. The sale of the poisons is the essential element or ingredient of the offence. That is conceded indeed by the form of this complaint itself, because your lordship will find that, according to the terms of the second charge, before my friend, Mr. Morison, can obtain a conviction under it, it would be necessary for him to prove a sale, because he charges me under it with keeping open shop and selling. But what sale would that be? Simply the sale which forms the subject of the first charge. Now this is just an example of a double charge and a double penalty out of one offence, and I therefore think, my lord, that although Mr. Morison has expressed his readiness to stand upon only one charge, I should at this stage, at all events, know upon what particular charge he is to take his stand.

Mr. Morison: I should have explained—the first.

Mr. Young: I concede to your lordship that it is in your lordship's power to strike out a part of this complaint.

The Sheriff: Under the Summary Procedure Act.

Mr. Young: And I should like to know whether it is the first or the second charge.

Mr. Morison: The second is to be struck out.

The Sheriff: The second count seems to be founded upon keeping open shop.

Mr. Morison: Yes, my lord, and I do not think I shall be able to establish that.

The Sheriff: Then that section may be deleted from the complaint, and the prayer of the complaint may be altered to this extent:—"May it therefore please your lordship to grant warrant to cite the said William Baillie, and thereafter to convict him of the said offence," and the words "one or both" will have to be put out. *Quod ultra* I am not prepared to sustain any objection stated by Mr. Young. The first objection is that the offence is truly an offence under the first section of the statute, and that that should have been libelled, and of course if it were necessary for me in disposing of this complaint to refer to the first section of the statute in considering whether the offence charged had been committed or not, there might have been great force in that objection. But it appears to me that the 15th section alone, upon which this case is founded, itself comprehends several substantive offences, independently altogether of the first section of the Act. As I read the section it specifies five separate offences, and it says that the party offending shall for every such offence be liable to pay a penalty or sum of £5. Now these words, "every such offence" imply to my mind that there is more than one offence there; and it seems to me there are truly five. The other matter is quite plain. I go quite with Mr. Young to this extent on the second objection, that there can be only one penalty for the same act—you are not to impose a double penalty for one act, and Mr. Morison has so far conceded that point, and has deleted the count from the information. I therefore propose to ask your client, Mr. Young, to plead. (Addressing the Respondent) Have you had a copy of this complaint served upon you?

Respondent: Yes, my lord.

The Sheriff: Do you plead guilty?

Respondent: Not guilty, my lord.

Evidence for Complainer.

John Rutherford Hill, Assistant Secretary to the Pharmaceutical Society, sworn and examined by Mr. Morison: I am a pharmaceutical chemist, and am twenty-nine years of age. I have been a chemist since 1878. I know the accused, Mr. Baillie. I have a register of the chemists and druggists under the Acts. I produce a copy for 1885-86, and a copy for 1886-87.

The Sheriff: These are registers of pharmaceutical chemists?

Mr. Morison: Yes; and they are received as evidence

under the Act. The 13th section; towards the end of the Act, provides that they shall be so received—"And the absence of the name of any person from such printed register shall be evidence, until the contrary shall be made to appear, that such person is not registered.

Examination continued: The name of the Respondent does not appear in either of these registers.

It appears in no register?—No.

Mr. Young: What! neither birth, death, nor marriage?

The Sheriff: It is quite enough that it is not upon these two registers.

Examination continued: I know the shop 53, Nicolson Street, Edinburgh. I called there on December 17, 1886. When I entered I found William Baillie, the accused, there, and my assistant, Alexander Coats, and an old lady whom I did not know. There was no other person in the shop.

Did you see what was being done?

Mr. Young: I object to that question. What is specifically charged is a sale to Mr. Coats. I am not here to inquire into sales to other parties.

The Sheriff: I don't think Mr. Morison is going into that.

Mr. Morison: I wanted to avoid putting a leading question.

Mr. Young: It would shorten matters if you put it. Did you see a sale to Coats?

Mr. Morison: I thought you would have objected to that.

The Sheriff: You seem to be afraid of the old lady, Mr. Young.

Mr. Young: No, I should be glad to have the old lady here.

Examination continued: I sent Coats, who was my assistant at that time, to make the purchase, and I followed him up immediately after. I saw him make a purchase of twopenceworth of laudanum. I made a purchase myself, and then followed my assistant out. I got the bottle from him, which had been delivered to him by the accused. I have the bottle here. I analysed its contents, and found it contained a preparation of opium. I had asked Coats to get laudanum, and the bottle contained laudanum.

And laudanum is a preparation of opium?—Yes.

The Sheriff: No doubt of it.

Examination continued: I took the bottle to Mr. Falconer King, and got him to analyse it. I saw Mr. Baillie, the accused, with the bottle in his hands putting the cork in it, and the laudanum was in it then. I then saw Mr. Baillie hand it to my assistant.

Cross-examined by Mr. Young: It is rather a dangerous thing to dispense laudanum, but it is not difficult for anyone who knows anything about it. I have not a shop of my own. I was brought up in Edinburgh, in the shop of Mr. MacDonald, West Newington. Speaking from memory, I think Mr. MacDonald had four *employés*, two of whom were qualified assistants. The other two were not assistants. One of them may have served in the shop sometimes, but he never sold poisons. One of them was in the habit of serving in the shop.

Do not you know it is the custom in the trade for lads who are not qualified assistants to sell from behind the counter, the business of course being under the supervision of a qualified man?—Yes.

The Sheriff: Do you mean to dispense poisons?—Not as a rule; it is not allowed.

Cross-examination continued: The question is—Is it the custom of the trade for unqualified assistants to dispense poisons under the supervision of one who is a qualified assistant?—Yes, under the supervision of a qualified person.

And it is quite a common thing, I suppose, for such unqualified *employés* to sell 2*d.* worth of laudanum?—Under the supervision of a qualified person.

What do you mean by under the supervision?—In his presence.

Would it ever be done out of his presence?—It would be an offence under the Act if it was so done.

Mr. Young: I am not asking your opinion.

Mr. Morison: I do not think that is relevant. Suppose he proves that fifty people commit the same offence, what then?

Mr. Young: I shall have occasion to refer to a passage in Lord Selborne's judgment again, which I think clearly meets the present case, and I want to show that there exists a practice just like that which his lordship described, a practice namely——

The Sheriff: This may have a bearing on the case. I am not disposed to exclude it; it may go to show the necessity of putting a stop to it.

Mr. Morison: And that is what I am here to do.

Mr. Young: On behalf of the very body of men who commit the offence.

Mr. Morison: Quite so.

The Sheriff: Pray, gentlemen, do not argue: just go on.

Cross-examination continued: The bottle containing the laudanum was duly labelled when I got it, labelled "Poison" just as it is now, the name of Center and Co., chemists, being also upon the label.

Mr. Young: I am going to prove that a company carried on business in this shop.

The Sheriff: With laudanum?

Mr. Young: Yes, one of the most familiar domestic remedies.

Cross-examination continued: What is Coats?—I believe he is now an apprentice, but at the time he made this purchase he was my assistant.

You say you sent him to make the purchase?—Yes.

Then how comes it that you went along with him?—I went simply to see the sale made.

The Sheriff: You went as a witness?—Yes.

Cross-examination continued: Did you select any particular time for going to the shop?—Yes.

What hour of the day was it?—About half-past three in the afternoon.

Why did you select that hour?—I understood the shop was in charge of an unqualified person at that hour.

How did you come to understand that?—From Mr. Center.

When did you understand it from him?—Some time previously when he called upon me in connection with another matter.

You precognosced him then?—Yes.

What took place?—He called for me one day between three and four o'clock, and did not find me, and he came back again the same night, and I apologized for not having met him in the afternoon, and said, "I suppose that is your dinner hour; you are usually out at that hour," and he said, "yes."

Had you called at his shop?—No.

How did it come that you asked him about his being out in the afternoon?—I knew he was in the shop well enough.

What did you want to do with the information?—I wished to see if the shop was really in charge of a qualified man at all times, or if it was some times in charge of an unqualified person.

Did you select the hour that Mr. Center told you was his dinner hour for going to the shop?—Two hours, I think he said.

But did you select the hour when you expected him to be away according to his statement?—Yes. Mr. Center is a qualified person, and his name appears in the registers I have produced,—in both of them.

By the Sheriff: When I went in the respondent was the only person in charge of the shop.

Alexander Coats, sworn and examined by Mr. Morison: I am 17 years of age, and am a druggist in my brother's employment. Up to the end of December last I was Mr. Hill's assistant. I recollect being told by him in December to go to the shop, 53, Nicolson Street, Edinburgh, and purchase laudanum, and I did so. When I entered

the shop, Mr. Baillie was in it and an old lady. There was no one else present. I asked Mr. Baillie for twopennyworth of laudanum, and he took my bottle and filled something into it out of a bottle which he took off a shelf. I gave the bottle to Mr. Hill immediately after leaving the shop. Mr. Hill came into the shop just when I was being served. I am perfectly certain there was no one else in the shop besides those whom I have mentioned. What Mr. Baillie did was to take my bottle and fill it with what I supposed to be laudanum and give it to me.

Cross-examined by Mr. Young: How long have you been connected with the trade?—I have never been connected with the trade specially; I have been with my brother.

Are you not an apprentice now?—Yes.

How long have you been an apprentice?—Not any specified time.

How long have you been an apprentice?—I cannot say.

Or won't say?—I cannot say.

Have you been long enough to be able to sell laudanum?—Yes.

Would you know laudanum if you saw it?—Yes.

It is pretty commonly sold, is it not?—Yes.

And you knew it when you got it?—Yes.

Was it taken from a bottle labelled laudanum?—I did not see. I think there is a back room in the respondent's shop. I was not in it.

Then, when you say there was no one else in the shop, you mean that no one else was in the front shop except you and Mr. Baillie and the old lady?—Yes. When Mr. Baillie was finishing giving me the laudanum Mr. Hill came in.

By the Sheriff: There was part of a label upon the phial when I gave it to Mr. Baillie. It was Mr. Baillie that put on the one that is there now.

Cross-examination continued: That is the usual label, is it not?—Yes. I was in the shop three or four minutes altogether, just long enough to get what I wanted. I did not put off any time. I am in my brother's employment at present. He is a chemist and druggist in Leith. He has two others under him besides me.

Are they qualified men—registered assistants?—No.

Has your brother a breakfast and dinner hour? I suppose he does not live in the shop?—That has nothing to do with this case.

Does he live in the shop?—No, he does not.

How far off is his house?—About a quarter of an hour.

And he goes home to dinner?—No.

Does he stay straight on in the shop from eight o'clock in the morning till what hour at night?—He goes to his dinner when he can get it.

When he goes to his dinner, whom does he leave in charge of the shop?—The assistants.

You three?—No, the assistants and I,—whosoever is in the shop.

By the Sheriff: He leaves one of you in charge?—Yes, he never leaves me in charge.

Cross-examination continued: No, I should think not. Is that quite a common arrangement in the trade so far as you know?—Yes.

By the Sheriff: Has the assistant power to sell laudanum when your brother is away?—Yes.

Mr. Morison: My only other witness is Mr. Falconer King, to prove that the bottle contained laudanum.

Mr. Young: I admit that it was laudanum, and a preparation of opium.

Mr. Morison: Then that is my case.

Evidence for Respondent.

Joseph Allan Center, sworn and examined by Mr. Young: I live in Grove Street, Edinburgh. I carry on business as partner of the firm of Center and Co., chemists, 53, Nicolson Street, Edinburgh.

By the Sheriff: Are you sole partner?—No.

Examination continued: I was 24 years of age on the 31st of January. I served an apprenticeship of four years to Mr. Billing, Chemist, Lauriston, and latterly in Queen Street. I passed the Preliminary examination required by the Pharmacy Act before I entered on my apprenticeship. I joined the Pharmaceutical Society as a registered apprentice or student about 1879. After my apprenticeship was out I went to be assistant to Mr. Rae, South Queensferry, and I was with him for about eighteen months in that capacity. It was while I was there that I became a qualified assistant. From Queensferry I went to Messrs. McIntyre, West Port, Edinburgh, and I was seven months with them, and at the end of that time I went into partnership with Mr. Baillie in connection with the chemist's business in Nicolson Street. I obtained my certificate in October, 1884. I produce my certificate. When Mr. Baillie and I started business we issued a circular to the public intimating that Center and Co. had succeeded to the business of the man who had been in the shop before. I produce a copy of the circular. Mr. Baillie was not a qualified person in the sense of the Act. I believe he served an apprenticeship as a wholesale druggist, with Messrs. Mackay and Co., Edinburgh. He was employed for about five years in their laboratory, and I believe had full charge for three years.

Mr. Morison: I was not aware——

Mr. Young: I want to show that nothing unreasonable was done.

The Sheriff: Is Mr. Center speaking of his own knowledge, because we do not want anything except what he knows himself?

Examination continued: You made inquiries, I think, when you entered into partnership with Mr. Baillie, and learned what you have just told us?—Yes.

Mr. Young: I am not to suggest that Mr. Baillie has passed his examination.

Mr. Morison: I would have brought evidence that he had gone up for examination.

Mr. Young: There is evidence that he has had considerable experience in the sale of drugs.

Mr. Morison: No, there is no proof that he has any experience of that. He has only been with a wholesale chemist.

Mr. Young: It does not give experience in selling twopennyworth of laudanum, but it gives experience in dealing with drugs.

Examination continued: You produce your contract of copartnership with Mr. Baillie?—Yes. It provides that the name of the firm should be Center and Co., and stipulates for my share of the profits. There is a bank account in the name of the firm. The first entry in it is dated September 9. All goods ordered by the firm since the commencement of the business have been ordered in the firm's name, and the sales have been made in the firm's name also. The firm's name is also over the door of the shop—Center and Co. There is also an insurance in connection with the business, and it is in the firm's name too. My name is on the Register of the Pharmaceutical Society.

Supposing one were to call at your shop at half-past three o'clock in the afternoon, would you be found on the premises?—As a rule I would.

If not in the front shop at least behind?—Yes.

A good deal of your compounding of drugs I suppose is done in your back premises?—Yes, they are all made up in the back.

So that when you are busy at that, the party at the counter would be Mr. Baillie?—Yes.

Has he directions from you as to the dispensing of such medicines as laudanum?—Yes, he can sell it.

And if he has any doubt about the matter, what are his directions?—He must consult me. The contract of copartnership provides for my taking charge of the dispensing part of the business particularly. That was arranged specially, looking to my qualification, and the arrangement has been carried out. Mr. Baillie takes a general oversight of the business and looks after the books principally.

With the exception of the prescription book?—Yes.

Which you write up?—Yes.

Cross-examined by Mr. Morison: I cannot sign the firm name.

By the Sheriff: Who does that?—Mr. Baillie.

Cross-examination continued: I have no capital in the business.

The whole concern belongs to Mr. Baillie?—No.

To whom does the capital belong?—The capital belongs to Mr. Baillie.

What is in the business besides the capital?—My experience.

The Sheriff: He contributes his skill.

Cross-examination continued: You get one-third of the profits?—Yes.

Provided they amount to £72 a year?—Or over.

And if they do not amount to that, Mr. Baillie makes up the difference?—The difference is made up from the profits.

If a third of the profits do not amount to £72, Mr. Baillie makes up the difference, does he not?—It comes out of the other share.

That is Mr. Baillie making it up. Can Mr. Baillie terminate the contract on three months' notice to you?—Yes.

Is it the fact that in your duties you are to be subject to Mr. Baillie?—Yes, except as to dispensing.

Where is the provision excepting dispensing?—"The said Joseph Allan Center shall take the more active charge of the dispensing department, including the transcription of the prescriptions into the prescription book, but he shall be subject in his duties to the direction of the said William Baillie"—is not that so?—Yes.

Who has power to engage and dismiss *employés*?—Mr. Baillie.

Then practically are you anything else there than a person with £72 a year or more of salary, and who may be dismissed on three months' notice?

Mr. Young: Before the witness answers this question I may point out that he is being asked his opinion on a point of law. I shall be happy when the occasion arises to contest that point with my learned friend. Meantime, to ask the witness his opinion as to the effect of the contract, is to ask him a question of law.

The Sheriff: He may be asked a question of fact.

Mr. Young: The question really went to the effect of the contract.

The Sheriff: It may go to that, but it is a fact.

Mr. Young: It is a matter of opinion.

The Sheriff: Mr. Morison is asking him as a matter of fact.

Cross-examination continued: Is it not the fact that you may be put away on three months' notice, and the whole thing remain with Mr. Baillie?—(No answer.)

Re-examined by Mr. Young: You were asked about the dismissal of *employés*; have you any *employés*?—No there are none.

By the Sheriff: It is you and Mr. Baillie who carry on the business?—Yes.

You have no assistants?—No.

Re-examination continued: I think you know something about the trade of people belonging to the Pharmaceutical Society, will you tell me whether it is quite a common thing in the trade to have a business carried on by a qualified person, whose assistants under him are not qualified?—Quite a common thing.

I think you said you would be in the shop between three and four o'clock in the afternoon?—Generally.

By the Sheriff: I do not remember December 17 last. I cannot say whether I was in the back shop on the afternoon of that day or not.

By Mr. Young: You come back from your dinner about three o'clock?—Yes, generally about three o'clock.

Thomas Baillie, sworn and examined by Mr. Young: I am the father of William Baillie against whom this charge is made. He was indentured to Messrs. Mackay and Co., wholesale chemists, Edinburgh, for, I think, five years. He served his time there, and he remained with them for some time afterwards. His duties lay in the laboratory. After leaving Mackay and Co., he was not very well and he came into my warehouse for a change. My firm are drysalters and provision merchants in Edinburgh. While my son was with me he got the offer of a situation from Messrs. Mackay and Co. as laboratory assistant. I produce the offer.

The witness was not cross-examined.

Mr. Morison: The case is now before your lordship, and I would submit that the offence here charged has been made out. In the first place I would ask your lordship's attention to the 15th section of the Act, which is the section founded on. It says that from and after the 31st day of December, 1868, any person who shall sell poisons, not being a duly registered chemist, is guilty of an offence and liable in a penalty. The object of the Act, as your lordship will find stated in the preamble, is to protect the public. My friend tried to make out a case of this kind, that provided a person is a qualified chemist he may open half a dozen shops in Edinburgh, put in Tom, Dick and Harry, and allow them to dispense poisons—and because he himself, the owner of the business, or some one in the business, is qualified, therefore the offence cannot be committed. Now my lord, I say that is not the interpretation of the Act, and that is not the meaning of the Act. The case of the Pharmaceutical Society *v.* The London and Provincial Supply Association I think determines that point. The case was a little different from this. It was a case brought for keeping open shop.

The Sheriff: An incorporation.

Mr. Morison: An incorporation: but in that case the person who actually dispensed and sold the poison was duly qualified; and in deciding that case the judges made certain observations which I think are very pertinent to this case.

The Sheriff: It was held in that case the word "person" did not apply to an incorporation, and that consequently an incorporation could not be convicted of an offence under the 15th section. But then they held that "person" applied to an individual, and that it applied to an individual employed by an incorporation, and that he might be prosecuted for a penalty, although the incorporation could not, if he was not a duly registered chemist.

Mr. Morison: Lord Selborne says on p. 865, English Appeal Cases—"The penalty also imposed by that section is, not like the 15th section, a civil debt to be recovered."

The Sheriff: He there speaks of the 17th section.

Mr, Morison: Yes, and he speaks of it as throwing light upon the construction of the 15th.

The Sheriff: Yes.

Mr. Morison: I do not think I need say very much upon that point. I think a person even in the employment of a duly qualified chemist may commit an offence under the 15th section if he sells a poison at his own hand. Now what have we evidence of here?

The Sheriff: Not being a duly qualified chemist.

Mr. Morison: Yes, now the evidence here is this. Two gentlemen went into this shop, and what takes place is seen. There is no attempt to go and get a qualified person at all, but an unqualified man takes the bottle and sells a poison. Now, my lord, I think that is certainly an offence. But I think if your lordship will look at the contract of copartnership which has been produced your lordship must arrive at the conclusion that the whole thing is just an attempt to evade the statute. That is apparent in every clause of the contract.

The Sheriff: In what way to evade the statute?

Mr. Morison: By enabling an unqualified man to carry on business and keep open shop under the colour of a registered man.

The Sheriff: But was not that practically what the House of Lords held might be done in the Pharmaceutical Society's case, for it was held that an incorporation might keep open shop, although themselves not qualified.

Mr. Morison: But I contend that it is unlawful for a person to do what an incorporation may under the statute lawfully do. An incorporation is not under the Act, because it cannot undergo an examination, and cannot be registered. But a person may be registered—may undergo examination, and may become qualified, and therefore a person is under the Act. Now, my lord, if this person simply is doing by an evasion what he ought to do in a legal manner, he is evading the Act. The reasoning in the case of the London Supply Association was this: the judges held that an incorporation could not be examined, and could not be put upon the Register, therefore the Act did not apply. But a person may be examined and may be put upon the Register, and therefore, although the Act does not apply to an incorporation it applies to an individual. This respondent is just attempting to evade the provisions of the Act. In that view the provisions of the contract of copartnership are of consequence, and I shall ask your lordship's attention to them. The first clause provides for the duration of the partnership for three years, and for the dissolution of it thus: "The partnership may be dissolved by the death of either party, or by the wish of the said William Baillie, who shall be bound to give three months' written notice to the said Joseph Allan Center in the event of his wish to terminate this agreement." Now what is to happen at the dissolution? That is provided for in the second clause in the contract, which is: "As the whole capital of this business, including cash in bank, goodwill, stock-in-trade, utensils, fittings, prescription books and others belonging to the said William Baillie, on the dissolution of the firm through any cause the same shall still belong to him or his legal representatives, and the said Joseph Allan Center or his legal representatives shall only be entitled to his portion of the share profits from the date of the last division of the profits to the date of the dissolution." That is just simply a salary by way of profit, nothing else. Then the third clause provides:—"The parties shall be interested in the profits of the business to the following extent, William Baillie to the extent of two thirds, and the said Joseph Allan Center to the extent of one third; but it is hereby expressly agreed that in the event of the share of the profits falling to the said Joseph Allan Center in any one year not reaching the sum of £72 per annum, the said William Baillie will be bound to make up the deficiency to the sum named so long as the partnership exists." Then if your lordship will look at the fourth clause of the agreement, towards the end, it is said: "It is agreed that all liability connected with the financial department of the business rests solely upon the said William Baillie, who relieves the said Joseph Allan Center of all responsibility whatever regarding debts due by the firm." Then the fifth clause provides that documents shall be signed by Baillie alone, and that he shall have sole power to engage and dismiss *employés*.

The Sheriff: I do not want to stop you, but the charge about keeping shop has been deleted.

Mr. Morison: Quite so.

The Sheriff: Is it not enough for you to make out the first charge, that there was a sale by a person not duly registered as a chemist? What have we to do with the agreement?

Mr. Morison: I agree with your lordship, but it was the other side who introduced this contract. The respondent is founding on it.

The Sheriff: That may be, but I do not see what we have to do with it. If we were dealing with the second count, which has been struck out of the complaint, there would have been a good deal of force in going into the agreement, because it might be said this was keeping open shop by a person who was not a duly qualified pharmaceutist.

Mr. Morison: Well, I submit I have made out my case upon the first point.

Mr. Young: The proposal that I maintain to your lordship is just directly the opposite. I should submit to your lordship, that the facts do not come up to a contravention of the statute. Observe, my lord, that what has been proved is certainly a sale by or for a company. No doubt the hand that dispensed the drug sold was the hand of one who could not be said to be a qualified assistant in terms of the Act, but he was a servant, and at the time acting as agent of the company whose sale it was. There is nothing in the Act, as your lordship will observe, to prevent persons forming a firm or company or association for the purpose of dispensing the articles which are dealt with by the Act, and what is necessary, I take it, is that the business should be under the charge of a competent man—a man with sufficient practical knowledge. It is quite true, as my friend has said, that this is not a statute which has been introduced for the sake of chemists, although, curiously enough, the procedure here is at the instance of the chemists. It is a statute introduced for the protection of the public. But the question then would be whether the safeguards which are intended by the statute to prevent mischief have been observed here or not, or whether we have what is tantamount to the very safeguard for which the statute provides. Now, my lord, I think we have. Just observe what really took place. We are not dealing with a case where parties are trying to evade the statute and putting themselves in a position that could only be held by men qualified according to the conditions of the statute, but the firm has as one of its partners a man who certainly was entitled to deal with the drugs which are mentioned in the Act, and we have it borne out in evidence that he takes the supreme charge of the dispensing part of the business. Now, how is such a charge to be exercised in connection with such a trade? Your lordship will observe this, that the superintendent of a shop like that may very well discharge his duty if he set aside certain medicine and say to his assistant who was in the shop with him, "That is so and so, if you are asked for so and so give that." If he gave directions of that sort, they would be just as reasonable and just as likely to serve for the protection of the public as if the directions had been given by word of mouth at the time of dispensing, or as if the medicine or drug was dispensed under his very eye. Of course in all these cases one must just, I think, put to oneself the question whether ordinary and reasonable precautions have been taken in the circumstances. Now, as your lordship will recollect, Mr. Center told us, and I thought he referred to a very sensible arrangement, that it was his rule, known to Mr. Baillie, that where Mr. Baillie had any difficulty in regard to things to be dispensed, he was at once to refer to him. Of course, I suppose that must have reference to those occasions when possibly Mr. Center for necessary purposes was absent from the shop, or it might be when Mr. Center was in the back room where it is said the usual work of compounding drugs goes on. Now for aught I know, and for aught the proof shows, Mr. Center was in the back shop when Coats and his master entered, and the purchase of twopennyworth of laudanum was made. For aught we know, Mr. Center, who tells us he took charge of the dispensing part of the business, was present, and when any difficulty in dispensing the drugs referred to in the Act was found by Mr. Baillie the arrangement was that he was to refer to Mr. Center, and usually between three and four o'clock in the afternoon Mr. Center was there, his habit being to return from dinner at three o'clock. Now, I take it, so far as the evidence goes, a reasonable assumption is, that although Mr. Center may not have been present in the front shop he was on the premises, so that if Mr. Baillie, who had had a very considerable experience in connection with these matters, had any difficulty at all, what he would

have done would have been to walk to the back room and consult his superintendent, for in the matter of dispensing the superintendent was really the party with whom he was bound to consult. Let me refer to a passage in Lord Selborne's judgment in the case to which reference has been made, the case of the Pharmaceutical Society against the Supply Association. The words are put in such a way as, I think, just to cover the case we are dealing with. On page 868 he says "It is true that the Legislature has in the Acts"—he is dealing with a case under section 16 of the statute—"required for the benefit of the public this safeguard that there should be an assistant duly qualified; but the Legislature says that, having that case in view, is was not thought necessarily inconsistent with the object and policy of the Act that the members or proprietors of the business, the persons deriving profit from it, or to whom those actually selling the drugs would be responsible, might be unqualified persons provided there was in the business a duly qualified assistant. It by no means follows"—and this is a sentence which I think applies with remarkable patness—"that all the drugs would necessarily be sold by that duly qualified assistant, or that he might not be, as in this case, under the general superintendence of a manager not himself duly qualified. All that is left open." Now when the Lord Chancellor uses words like these, which, I think, apply in direct terms to the case with which we have to deal—when he says it is left open—what does he mean? I think he means this—it is left open to the Court to consider whether after all, looking to the arrangements in connection with the particular business in question, reasonable precautions are taken for the safeguarding of the public. Now my lord, I maintain that that is the condition of things in connection with this business. I am not much concerned about the observations that were passed upon the nature of the copartnership that exists between the two individuals, because, I think, this commentary may be made upon it, that it is just conceived in those very terms which we would expect to meet where an arrangement of this sort is made between capital on the one hand and skill on the other.

The Sheriff: Yes.

Mr. Young: And in connection with the superintendence which Mr. Center says he does take of this business, let me remind your lordship that he might reasonably put considerable confidence in Mr. Baillie, because Mr. Baillie is not a mere raw hand like a lad of seventeen who says that boys about Leith are left to take charge of the shop in the absence of the chemist who keeps it. My lord, this is a pretty wide question which the chemists are now raising. If the evidence that your lordship has heard to-day is true, there is scarcely one of the chemists who have persons in their employment—it may be serving their apprenticeship—I have no doubt they are, and right it is they should serve their apprenticeship—who is not in the habit of selling all sorts of drugs by the hand of these unqualified persons when not under the eye of a qualified assistant, whose duty it is to take the direct superintendence of the business.

The Sheriff: Mr. Morison says that is the very thing he wants to prevent.

Mr. Young: Exactly, and curiously enough the Pharmaceutical Society, whose members have a practice of that sort, are the complainers here. It seems to me rather ridiculous, and it indicates to my mind that there is something more behind this than a mere desire to subserve the interests of the public, because if it is a common practice, why should this particular instance be selected, and why should the Secretary of the Society with the aid of this lad of seventeen act the part of detective in the matter?—I should submit to your lordship that after all they really have not shown that there has been any disregard in connection with this business of the very steps which ought to be taken for the protection of the public in the purchase of such drugs. It is a business which is carried on under the direct charge of a qualified assistant. I think it would be a straining of the Act to say that where a qualified assistant is so attached to a business he is bound to be there, and even for the gravest necessity must not leave the shop. If he, in the course of his superintendence, gives the directions whch Mr. Center tells us he does give for the purpose of keeping the public safe, and if in the case of any doubt being present to the mind of the assistant, he is bound to resort to him, surely the very best measures are taken that nothing harmful shall happen. Now, my lord, if that be so, I should submit that that is not the kind of case which really is intended to be struck at by the Act. It is just the kind of case which the Lord Chancellor referred to as an open one when he said "it by no means follows that all the drugs would necessarily be sold by a duly qualified assistant." Accordingly, reminding your lordship of the wide question that is raised, if it is to be maintained that everybody who sells must be a qualified assistant——

Mr. Morison: Poisonous drugs.

Mr. Young: Poisonous drugs; that the hand which sells must be that of a qualified man, reminding your lordship of the question that is raised by that, I should submit that there were here fairly reasonable precautions taken by those who were in charge of the business, the business being superintended by a duly qualified person, and that in these circumstances a conviction of an offence under the statute would be harsh and uncalled for.

The Sheriff: There were originally two counts in this complaint, founded upon the Pharmacy Act of 1868. The second of these was for a penalty as for an offence committed under the Act of keeping open shop in contravention of the 15th section, the party not being a duly qualified person within the meaning of the Act. But that count in the complaint has now been deleted on the motion of the prosecutor's agent, and that renders it quite unnecessary for me to consider the terms of the contract of copartnery between the respondent, Mr. Baillie, and his partner, Mr. Center. It was suggested that the contract was merely an attempt to evade the provisions of the statute to enable a person who was not a duly qualified person to keep an open shop for the sale of drugs and poisons, and so on; but all that I need say in the meantime is that it is certainly not an illegal contract apart from anything that is contained in this statute for one member or partner of a company to contribute his skill or labour while another contributes the capital. Whether this contract really in its terms and provisions tended or was an attempt to evade the provisions of the 15th section of the Pharmacy Act, I do not think it is necessary for me to determine at all, because the second count of the complaint has been withdrawn, and the only charge that is now insisted on is that founded on the same section of the statute—the 15th section—which renders it an offence for any person to sell poison who is not a duly registered chemist. Now the preamble of the Act obviously shows that the purpose of the Act, and of every clause in the statute which imposes restrictions on the sale of poisons, was for the protection of the public generally. It was just to prevent persons who had no knowledge of these matters, who might perhaps confound epsom salts and oxalic acid, from being allowed to dispense them to the public. The facts certainly here are that the respondent is not a duly registered chemist, although he is in partnership with one, and under the firm of Center and Co. On December 17, at half-past three in the afternoon, the witness, Alexander Coats, who was then assistant to Mr. Hill, the Secretary of the Pharmaceutical Society, called at their shop in Nicolson Street, the only persons then in the shop being Mr. Baillie, the respondent in this complaint, who was attending to the shop, Coats himself, an old lady who does not seem to have been found, and shortly after Mr. Hill himself, who followed up his assistant. Coats asked

for two pennyworth of laudanum, and produced the phial, which has been exhibited to the witnesses, to get it filled, and the respondent went and filled it with laudanum—there is no doubt it was laudanum—from a bottle, and gave it him back with the label upon it, which it now has. It was properly labelled laudanum, with the name of Center and Co. as the sellers. Now it seems to me there is no doubt that that was a sale of a poison by a person not a duly registered chemist, and certainly within the very letter of the provisions of the 15th section of the statute. It is said that Mr. Center, who took upon himself, as being the qualified partner in the concern, the particular duty of mixing up prescriptions, and dispensing medicine and drugs, might have been in his back shop on the occasion in question; but that is not proved, and I think it is quite certain, from the view entertained by the House of Lords in the case cited in the course of the discussion, that if an unqualified person carries on a business of this kind he must see that poison and articles of that kind are dispensed by a person who is duly qualified. A passage was read, which my friend, Mr. Young, seemed to think tended in the opposite direction, in the opinion of Lord Selborne, on p. 868 of the report. Lord Selborne, although he says in that passage that it is at least not thought indispensable that persons carrying on such a business as that should without exception be duly qualified, goes on to say, "If, my lords, there had not been adequate safeguards against the sale of poisonous drugs in a manner contrary to the provisions of the Act by the persons actually carrying on the business for the incorporation; then I think the argument would have been extremely strong against incorporations being permitted to carry on the business"—and when he says incorporations that applies to all unqualified persons—"but where you find such safeguards and that every one whom they employ will be penally answerable, if he sells or compounds poisons or other medicines without having the qualification required by, or without complying with the provisions of the Act, I am unable to conclude that the purposes and objects of the Act require a larger construction to be placed upon the word person in the 1st and 15th sections, than that placed upon it by the Court of Appeal." And accordingly I think it is not doubtful that in the opinion of Lord Selborne and the other judges who decided that case in the Court of last resort, a person who sells drugs or poisons must himself be a duly qualified person, although he may be employed by a corporation or a person who has not a qualification. Now it is said that there has been a practice in this city and elsewhere, for parties who had the qualification leaving unqualified assistants to look after the business in their absence, and giving them more or less minute instructions as to the sale of poisons or other dangerous drugs. If that practice exists to any extent at all, I am convinced it is an exceedingly dangerous one, and Mr. Morison says it is to put an end to that that this complaint is brought. Nothing can be more dangerous than for a druggist to go to dinner and leave a boy in charge of the shop, who does not know epsom salts from oxalic acid. The same observation does not apply with equal force to all poisons. Laudanum is a thing well known, and is often sold in small quantities, and perhaps there is less danger from these; but it is not with reference to any particular poison or drug that we are now considering the matter, but with reference to the sale of poisons generally. I am quite satisfied that any such practice, if it exist, is a wrong practice, and should be put an end to. I am of opinion, therefore, on the facts, that this complaint has been proved. At the same time there are some extenuating circumstances here. The practice has been referred to—I do not think that this is an extenuating circumstance—but it appears here that in point of fact the prescriptions were made up by this firm by a duly qualified person in general, and that all that the respondent, Mr. Baillie, did, was to sell a small quantity of laudanum, a very well-known thing about which there was not much danger of mistake being made, on one occasion to a customer. I fine the accused in the nominal penalty of 2*s.* 6*d.*, with £3 9*s.* 6*d.* of expenses.

Mr. Young: Will your lordship give us a case for appeal.

The Sheriff: Yes, if you desire it.

Prosecution for Selling Defective Tincture of Quinine.

At the Wolverhampton Police Court, on Friday, February 25, before the Stipendiary, Mr. N. C. A. Neville, Mr. John Tunley, chemist, High Street, West Bromwich, was charged with selling tincture of quinine not up to the proper standard. The assistant-inspector purchased 1*s.* worth of tincture of quinine, and defendant told him it was ready mixed and just as he had purchased it. The analysis showed that was not up to the standard of the Pharmacopœia.

Mr. Glaisyer, for the defence, stated that the small quantity which was short was accounted for by crystallization, consequent upon having been kept in stock for some time. Defendant had been in business for fifty years, and was a most respectable chemist.

The Stipendiary said if it was not for the importance of drugs being pure he should not say that was a very material case. The analysis showed there were 6½ grains of quinine instead of 8. It was important drugs should be as pure as possible. Fined 40*s.* and costs—total, £4 2*s.*—*Midland Counties Express.*

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Future of Pharmacy.

Sir,—From the effect which my previous note, on some aspects of pharmaceutical politics in Sheffield, has produced, it would appear as though there had been good reason for its publication, and that its purpose has been, in a degree, served. I should like now, however, to point out how my opponents have fallen into error, partly through misunderstanding my arguments and by crediting me with opinions which were neither expressed nor implied. Since, too, my assumption of the pseudonym of "A Sheffield Student" is regarded as an unworthy disguise, I will, with your permission, cast aside the mask, and so remove any obstacle, fancied or real, to free and fair discussion.

I would first thank Mr. Cubley for the compliment with which he prefaces his attack, and, next, proceed to show where he has gone astray in considering my remarks. I should have thought that his own experience in life generally, together with the information he must have acquired concerning human nature, would have furnished him with facts enough from which he might reason that the public is best fitted to care for its own safety. Exercising its choice as to what it will purchase, and where it will obtain the same, it is surely but reasonable to assume that the tendency will ever be to avoid inferior articles and makers of such, and to turn to conscientious dealers in more satisfactory wares. What can be clearer? Then, to say that the public elects a Parliament which cares for the general safety, is but asserting that the public looks after itself. For what is Parliament, in its widest sense, but the public? And, though this public delegates certain powers to the Pharmaceutical Society, we have no right to assume that it deputes also the care of its own safety to that body. It merely binds the whole body of pharmacists and druggists, as represented by the Society, to perform their duties under certain restrictions in order that its safety may not be endangered. And, as compensation for this infringement on their liberty as individuals, it gives them the right to insist that no one shall deal in certain articles, to wit, some poisons, save and except they, through their representatives, shall have pro-

nounced them duly qualified to deal in the same. The care for the public safety is evinced in the public's enforcement, by its law, of the labelling and registration of those poisons; the power deputed to the Society merely gives it the right to say who are fit and proper persons to perform this labelling and registration. Here we see plainly enough the necessity for the existence of the Pharmaceutical Society, and of the education of pharmacists, from the provisions of the public's own Act, quite apart from the desire of all true pharmacists to elevate themselves and their calling. If my acquaintance with the data of pharmaceutical history does not mislead me, this desire it was which called the Society into being before any Pharmacy Act was known. Such Act but gave the body a legal standing and, in the opinion of some few, crippled its influence for good by compelling it to recognize all who complied with certain tests as equally worthy of public support, so preventing merit, in individuals, from achieving its full reward. In the passing of the "Food and Drugs Act" again, we find that it is the public which protects itself. I most certainly do not admit the contrary when I say that "the poorer classes suffer most by the fraud," for, though proximately they do suffer, it will be found that ultimately they profit by the experience so gained, and seek more trustworthy sources for their future supplies.

Sufficient objections to the legalization of the Pharmacopœia as the sole standard for all medicinal preparations are given at length in the "leader" of January 22. These are worthy of a more critical examination than they appear as yet to have received from many, and need no further exposition by me. I would but reiterate that multiplication of each pharmacist's efforts to inspire public confidence in his integrity is the best safeguard against unprofessional competition, whether from within or without, and that, compared with this, any legislation must prove futile.

Mr. Ward's diffidence in supplying the information I desiderate is perhaps excusable in one occupying his position as compared with that of a humble student like myself, yet I think it will be generally conceded that his apprentice, Mr. Hollely, does worthy service in his master's place. And, since the epistle of the latter has a decidedly Wardian tone, I presume we may take it that the pupil's opinions and remarks are but echoes of those of his respected principal. The youthful inexperience of the writer is doubtless the cause of his many rash statements and startling conclusions, hence I will try to deal with them as gently as is consistent with the necessity for correcting them.

That my contribution "might be termed a personal attack on two gentlemen of this town" is surely "unhistorical," for I was most careful to avoid touching upon any point save those dealt with in the letters of those gentlemen, and a very careful survey of my words fails to reveal anything of a personal nature. If I have unwittingly touched any sore places, I apologise, and my excuse must be my great desire for strict justice.

Mr. Hollely next repudiates my authority to speak for "true students," and would accept the baas of the black sheep mentioned by Mr. Cubley as most rational expressions of opinion formed after mature deliberation, instancing as evidence the direction taken by the "younger members" in voting at the recent indignation meeting. Now I will first venture to assert that only some of the "younger members" were then present, and secondly, that most of the "younger members" who were present were unfitted to consider the questions under discussion. Again, since I gather from the official report that all the resolutions were carried unanimously, and it is well known how unlikely "younger members" attending such meetings are to balance the arguments for and against the propositions (besides which I believe that in this case the arguments were mostly on one side), it seems plain to me that "follow my leader" was the rule acted upon. So much for the value of such evidence. With wider experience I doubt not that Mr. Hollely's conception of true studentship will undergo considerable modification.

In the next paragraph the "care of the public safety" comes to the fore again. How proud all engaged in the art of pharmacy should be, and withal, how conscientious in the discharge of their duties, were it really the fact that such care does devolve upon them. But does it? I would suggest that this bubble has been pricked, so that it is no longer possible to float it. A little confusion in my antagonists' ideas and words is apparent at this stage. I am asked, "What is Parliament but the crystallized opinion of the public or State?" Speaking generally, I reply, "Nothing!" and therefore it is plain the State and not our Society has the "care of the public safety" at heart. Again, "Therefore who can deny 'the care of the public safety' was not entrusted to the Pharmaceutical Society by the public and for the public?"

Well, I cannot! But, lest my opponent rejoice too soon at my capitulation, I would remind him that in the English language two negatives in a sentence make that sentence an affirmative one, and that my apparent yielding at discretion is due to his incorrect composition. I do deny that "the care of the public safety" was entrusted to the Pharmaceutical Society "by the public and for the public!"

Then I fail to see how the sale of "poisons" can be left to the working of "natural causes," or in what words I implied the possibility of any such process. A "sale," as I understand it, is a very artificial transaction; but vigorous definition and careful analysis seem quite beneath my critic's ideas and not worthy of consideration.

Anon, I am accused of ignorance of the existence of "Pharmacy Acts" and "amendments." How, where, or when I used any form of words that could be twisted to give grounds for such a supposition I am puzzled to think; of course I would not pretend to compete with a local secretary or his pupils in legal knowledge or close acquaintance with the "Calendar." That might be highly presumptuous and blameworthy on my part.

Concerning my "vague reasoning (?) against legislation," I would refer him to the articles on this subject in recent Journals, and to the earlier part of this letter. It might be advisable to sweep away a few intellectual cobwebs first, however.

My reference to local secretaries merely implied that such, being presumably leading lights in our profession, might be assumed to be educated to the highest possible pitch, and most imbued with regard for professional character, and, therefore, better fitted to survive any unfair opposition.

If Mr. Hollely should ever commence business as a pharmacist, let him try the effect of supplying sweet nitre diluted with its own bulk of water to "ordinary members of the discerning public," and he will soon know that they can distinguish the false from the true. In any case I would strongly advise him to avoid the practice if he values reputation and profit.

Regarding "paregoric *minus* opium," I have it on the word of one of our local lecturers, that he actually was asked for this preparation by a customer on Friday, 18th ult.

To conclude my survey of this remarkable letter I would venture to oppose to the writer's opinion my own that it is not the uneducated, but the presumably well-educated members of the trade who play most mischief. If the leaders go astray the rank and file cannot be blamed for following their example. With this opinion I join "an earnest desire that the law be made a terror to evil-doers," that such people may be no longer allowed "to palm on the innocent 'discerning public' their half-and-half preparations with impunity."

No alteration in the law is needed to effect this result, and if pharmacists will be true to themselves and to their fellow-men no law will be needed at all.

Sheffield. JOHN HUMPHREY.

Errata.—Benevolent Fund List of Subscriptions:—Page 707, Allan (Bury St. Edmunds) should read Allen; page 715, Vawser (March) should read 5*s.*, not 2*s.* 6*d.*; page 716, in the Oldham list the name of F. Goodall, 10*s.* 6*d.*, should have appeared.

Erratum.—On p. 698, col. i., line 45, for "the seeds of a new species, *Strophanthus hispidus acera*," read "the seeds of *Strophanthus hispidus* from Accra."

Army.—Strictly speaking there is no such post; the work is done by persons who have previously enlisted.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Proctor, Blunt, Christy and Co., Griffith, Church, Elborne, Hill, S. H., S.

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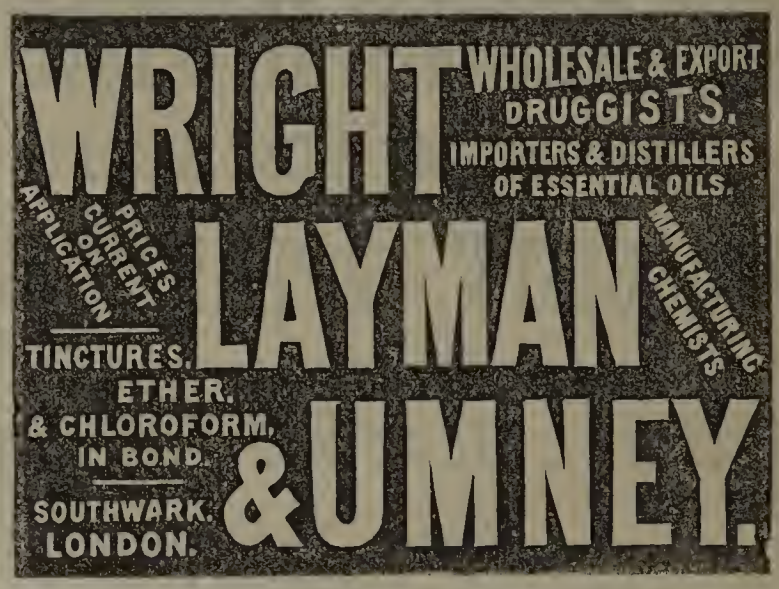

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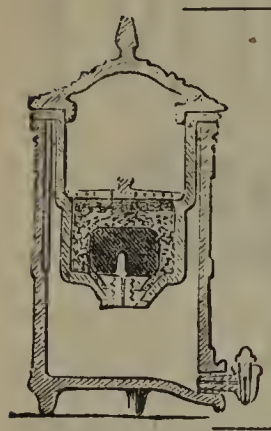

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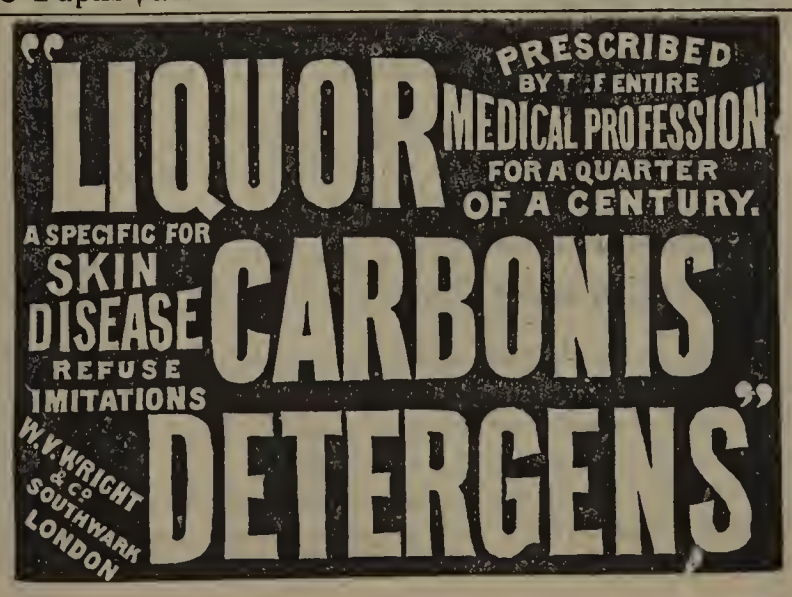

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A QUALIFIED and experienced ASSISTANT in a first-class Retail and Dispensing business. South Coast. Apply, personally, SAVORY & MOORE, 143, New Bond St., London.

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IMMEDIATELY, a good pushing JUNIOR, age 23, for a general Retail. Must be a good Counterman, abstainer, and able to Prescribe. Particulars of height, salary and references, to A. Z., Messrs. Newbery, 1, King Edward St., London.

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ASSISTANT, with Minor qualification, accustomed to good Country trade, businesslike, and well recommended. Salary £60. Send full details, and enclose carte (to be returned), to S., Sanger's, Oxford St., London.

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AN ASSISTANT, in-door, about 25, of good address, and accustomed to first-class Dispensing. (Two Assistants kept.) State full particulars of previous engagements, salary required, &c, enclose photo, to be returned, FOSTER BLADES, 10, Gloucester Rd., South Kensington, S.W.

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HAMILTON LONG & CO., State Apothecaries and Chemists to the Queen, 3, Lower Sackville St., Dublin, have a vacancy for a Junior ASSISTANT. Apply, stating references, age, height, and salary required (in-doors), with carte, to be returned.

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EARLY in April, an ASSISTANT (out-door) for good Country trade. Short hours. No Sunday duty. One who can Prescribe and Extract Teeth preferred. Apply, stating usual particulars and salary required, to GRADIDGE, Chemist, Andover.

BUSINESSES FOR DISPOSAL.

Advertisements under this heading are charged as follows—Fifty words not exceeding seven lines, or less, 3s. 6d.; each additional seven words, or less, 6d.; two initials or two figures counting as one word.

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FORTHWITH, by private treaty, the Goodwill, Fixtures, and Stock-in-trade of an old-established Drug business, in the main thoroughfare of one of the most pleasant suburbs of Manchester. Price for goodwill, fixtures, and stock-in-trade £450; or £180 for fixtures and goodwill alone, and the stock-in-trade to be taken by the purchaser at a valuation. Shop rent £40 per annum. Lease could be had of the premises for a term of years if desired. Business capable of extension. A grand opening for an energetic business man. For further particulars apply to ROBERT INNES, Solicitor, 53, Princess St., Manchester.

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OLD-ESTABLISHED Suburban BUSINESS, now under Assistant. A principal could do much more. Exceptionally good house. Large and commanding shop, nicely fitted and stocked. Returns about £600; trial allowed. Cause of sale proprietor not having time to attend to it. References exchanged. CHEMICUS, Barclays, 95, Farringdon St., W.C.

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A THOROUGHLY sound BUSINESS, returning from £800 to £1000. Must bear the strictest investigation. Apply, TENAX, care of Southall Bros. & Barclay, Birmingham.

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GENUINE Dispensing, Prescribing and General Retail BUSINESS, in good country town. East or South of England preferred. One that will stand strict investigation, and show a return of about £800 per annum, at fair prices. Cash will be paid for suitable business. CHEMIST, Messrs. Edwards & Son, 157, Queen Victoria St., London.

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A General Agency and a Mart for the negotiation, transfer, and sale of all descriptions of Practices, Partnerships, Businesses, Properties, &c., and to which is attached a Home for the reception of paying Patients, and a Staff for the Supply of Trained Nurses, &c.

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The liability of Shareholders is strictly limited.

There are upon the books the names of about 4000 clients, correspondents, &c., and the business for negotiation represents at present about £750,000, from which considerable profit will be realised.

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JOHN OGLE, Esq., 7, King's Bench Walk, Temple, London, E.C.

C. SWABY-SMITH, Esq., M.R.C.P., &c., Herne Hill, London, S.E.

*CHARLES F. RIDEAL, Esq., 27, Margaret Street, Cavendish Square, London, W. (*Secretary*).

(*One additional Member to be elected by the Shareholders*).

* Will join after allotment.

Bankers.—THE LONDON & COUNTY BANKING COMPANY, Hanover Square, London, W.

Solicitor.—J. F. S. CRIDLAND, Esq., 17, Bedford Row, London, W.C.

Auditors.—Messrs. HIBBERD, BULL & Co., *Chartered Accountants*, 17, King's Arms Yard, Coleman Street, Bank, London, E.C.

Broker.—R. C. MAY, Esq., 2A, Copthall Court, Throgmorton Street, London, E.C.

All information, together with prospectuses and application forms, can be obtained from the Company's Registered Offices, 27, Margaret Street, Cavendish Square, London, W.

The British and Colonial Agency, Limited.

NOTICE.

THE Directors are able to announce that they will proceed to allotment on Monday, March the 7th, after which the remaining Shares (if any) will be issued at a premium. Applications should therefore be made without delay.

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Others from £100 *to* £4000, *free on application.*

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STRAND,
LONDON

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3. MID KENT.—Old-established good class Family BUSINESS. Held by vendor many years. Returns nearly £900. Profits considerably above the average. Good position and large house. Every investigation courted. Open to an offer.
4. SUFFOLK.—Good town. Light Retail, Dispensing and Prescribing BUSINESS. Returns at present about £650 yearly. Profits large. Good house, garden, &c. Price £450.
5. KENT (Seaside).—Good town. Retail and Dispensing BUSINESS, with some Mineral Water trade attached. Returns nearly £1350 yearly. Full prices for everything. Price about £1200.

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WANTED.—First-class Dispensing Businesses, either in London or good Provincial Towns. Profits not under £500 yearly.

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SOLUBLE ESSENCES

ARE GUARANTEED TO BE THE FINEST IN THE MARKET.

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HAY'S GINGER ALE EXTRACT. For Second Quality Ginger Ale.
This Extract is strongly recommended for the manufacture of Ginger Ale, to which it imparts *Pungency, Colouring*, great *Brilliancy*, and an unusually *Fine Ginger Flavour and Aroma*, and makes a thoroughly good article. *Trade Price*, 4*s.* 6*d. per lb.*; 12*lbs. and upwards*, 4*s.* Quantity required, three fluid ozs. to each gallon of Syrup, making 106 10-oz. Bottles.

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This Essence, which is a complete Bouquet of Flavours in a highly concentrated state, makes a Ginger Ale possessing an amount of aroma, flavour, and quality that will be sure to command a large sale, and that is unsurpassed by the so-called finest Belfast Ginger Ale. *Trade Price*, 9*s. per lb.*; 12*lbs and upwards*, 8*s.* 6*d.* Quantity required, half a fluid oz. to each gallon of Syrup, making 106 10-oz. Bottles. This Essence will be found most valuable to the general trade.

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HAY'S HOP ALE ESSENCE.
This Essence is made from the *Choicest Hops grown*, and is unrivalled for its peculiarly fine *Hop Flavour* and aroma. *Hop Ale* made from this Essence has the full flavour of the *finest Hops*, and is a really *appetising Bitter Beer*. *Trade Price*, 8*s.* 6*d. per lb.*; 12*lbs. and upwards*, 8*s.* Quantity required, two fluid ozs. to each gallon of Syrup, making 106 10-oz. Bottles.

W. HAY Manufacturing Chemist, Beverley Road, HULL ENGLAND.

Indentors, to prevent disappointment, should specify that the goods are to be of HAY'S MANUFACTURE

W. HAY CAUTIONS THE TRADE against the use of those spurious so-called **SOLUBLE ESSENCES** which, besides having **NO GINGER AROMA**, are **FLAVOURLESS, RANK**, and **DISAGREEABLE**, and are little more than **TINCTURES of CAPSICUM.**

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The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 872.] SATURDAY, MARCH 12, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

ANNUAL SUBSCRIPTIONS.

All Annual Subscriptions are now due.

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Subscription payable by Associates and Apprentices or Students 0 10 6

Cheques and Post Office Orders should be made payable to the Secretary, and crossed "London and Westminster Bank."

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held.

EVENING MEETING.

36, YORK PLACE, EDINBURGH.

An Evening Meeting of the Society will be held at 36, York Place, Edinburgh, on Wednesday next, March 16th, at eight p.m. The chair will be taken at half-past eight precisely by Mr. H. BELLYSE BAILDON, B.A. Oxon., F.R.S.E.

The following papers will be read :—

"Note on a Theory of Emulsification." By WILLIAM GILMOUR.

"Practical Remarks on Pearl Coating of Pills." By WILLIAM GILMOUR.

"Note on Lime Water." By J. I. FRASER.

"Note on the Corrosion of a Zinc Refrigerator by Ammonium Chloride and Potassium Nitrate." By J. H. FISHER.

"Note on Syrup of Tolu." By FRED. STEPHENSON.

"Presence of Manganese in Chlorinated Lime." By ALEXANDER SHAND.

ELECTION OF COUNCIL AND AUDITORS.

EXTRACT FROM THE BYE-LAWS.

SECTION 5, CLAUSE 3.—"Any person qualified to vote desirous of nominating any Member for election as a Member of the Council or as an Auditor, shall give notice in writing, with the name and address of the nominee, and, if for the Council, disclosing whether such nominee be or not a Pharmaceutical Chemist, to the Secretary of the Society, *on or before the 24th day of March*, in every year; and the Secretary shall, on or before the 26th day of March then instant, address and send by post to each nominee a notice of his having been so nominated, and inquiring whether he will accept office if elected, and in default of a written reply from such nominee, declaring his readiness to accept office, if elected, being received on or before the 31st day of March then instant, such nominee shall not be deemed eligible or willing to be elected."

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 11 a.m., on the **second Tuesday** in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself :—

Aberdeen	Cheltenham	Inverness	Norwich
Birmingham	Darlington	Jersey	Nottingham
Brighton	Douglas, Isle of Man	Lancaster	Oxford
Bristol	Dundee	Leeds	Peterborough
Cambridge	Edinburgh	Lincoln	Sheffield
Canterbury	Exeter	Liverpool	Shrewsbury
Cardiff	Glasgow	London	Southampton
Carlisle	Guernsey	Manchester	Truro
Carmarthen	Hull	Newcastle	Worcester
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,, Strychnine and Belladonna		7 0	24 0
Anti-Cholera	2 gr.	7 0	24 0
Anti-Dyspepsia (Fothergill's		7 0	24 0
Aphrodisiac		16 0	59 6
Arsenious Acid	1-50 gr.	5 0	16 0
,, ,,	1-20 gr.	5 0	16 0
Asafœtida, U.S.		5 0	16 0
,, Compound, B.P	5 gr.	5 0	16 0
Atropine	1-300 gr.	7 0	24 0
,,	1-100 gr.	7 0	24 0
Blue Mass, B.P.	1 gr.	5 0	16 0
,, ,,	2 gr.	5 0	16 0
,, ,,	3 gr.	5 0	16 0
,, ,,	5 gr.	5 6	18 0
,, ,, Colocynth and Hyoscy		9 0	32 0
Calcium Sulphide	1-10 gr.	6 0	20 0
,, ,,	1-4 gr.	6 0	20 0
.	1-2 gr.	6 0	20 0
,, ,,	1 gr.	6 0	20 0
Calomel, Colocynth, and Hyoscyamus		9 0	32 0
,, Comp. B.P.	5 gr.	5 6	18 0
,, and Opium		7 6	26 0
Camphor and Hyoscyamus		5 6	18 0
,, Mono-Bromated	2 gr.	11 0	39 6
Cannabis Indica Extract	1-4 gr.	7 0	24 0
,, ,, ,,	1-2 gr.	9 0	32 0
Cascara Sagrada Extract	3 gr.	7 0	24 0
Cathartic Compound U.S.P.		5 6	18 0
Codeine	1-2 gr.	20 6	79 0
Colocynth Comp. B.P.	4 gr.	8 0	28 0
,, ,, ,,	5 gr	9 0	32 0
,, ,, and Blue Mass	5 gr	9 0	32 0
,, ,, and Calomel	5 gr.	9 0	32 0
,, ,, and Hyoscy, B.P.	5 gr.	9 0	32 0
,, ,, Extract, B.P.	5 gr.	9 0	32 0
Conium Compound, B.P.	5 gr.	5 0	16 0
Copaiba Compound		5 6	18 0
,, and Oloe-Resin Cubeb	5 gr.	11 0	39 6
Corrosive Sublimate	1-30 gr.	5 0	16 0
,, ,,	1-20 gr.	5 0	16 0
,, ,,	1-10 gr.	5 0	16 0
Croton Chloral	1 gr.	10 0	36 0
,, ,,	2 gr.	17 0	63 6
Cubeb, Olco Resin, with Soda		7 0	24 0
Digitalin	1-60 gr.	7 0	24 0
Elaterine	1-20 gr.	13 0	47 6
Emmenagogue (Mutter's)		5 6	18 0
Ergotin	3 gr.	16 6	63 0
Euonymin	2 gr.	16 0	59 0
,,	3 gr.	20 6	79 0
,, Compound		16 0	59 0
Ferruginous (Blaud's)	3 gr.	6 0	20 0
,, ,,	5 gr.	7 0	24 0

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,, and Iron		11 0	39 6
Ipecac. Powdered	1-4 gr.	5 0	16 6
,, ,,	5 gr.	5 0	16 0
,, Comp. (Ipecac. and Opium)	5 gr.	9 0	32 0
,, and Squill, B.P.	5 gr.	5 0	16 0
Iron Arseniate	1-8 gr.	5 6	18 0
,, Carbonate, B.P.	5 gr.	5 6	18 0
,, by Hydrogen (Quevenne's)	1 gr.	5 0	16 0
,, Iodide (Blancard's Formula)	1 gr.	7 0	24 0
,, and Quinine Citrate	2 gr.	10 0	35 6
,, Quinine, and Strychnine		13 6	49 6
Laxative Vegetable (Improved Cath.)		5 6	18 0
Manganese, Bin-oxide	2-gr.	9 0	32 0
Mercury, Bin-Iodide	1-16 gr.	5 0	16 0
,, Proto-Iodide	1-8 gr.	5 0	16 0
,, ,,	1-4 gr.	5 0	16 0
Morphine, Muriate	1-8 gr.	7 0	24 0
,, ,,	1-4 gr.	9 0	32 0
Narcotic Extracts (Brown-Sequard)		15 0	55 6
Nitro-Glycerin	1-100 gr.	7 0	24 0
,,	1-50 gr.	7 0	24 0
Opium, Powdered	1 gr.	7 0	24 0
,, and Acetate of Lead, B.P.	5 gr.	7 0	24 0
,, and Camphor		7 0	24 0
Pepsin, Pure Concentrated	1 gr.	9 0	32 0
Phosphorus	1-000 gr.	6 0	20 0
,,	1-50 gr.	6 0	20 0
,,	1-30 gr.	6 0	20 0
,, and Iron		8 0	28 0
,, Iron and Quinine		17 0	63 6
,, and Nux Vomica		7 0	24 0
,, Nux Vomica and Iron		8 0	28 0
,, and Quinine		17 0	63 6
,, Quinine, Iron, & Strychnine		17 0	63 6
,, and Valer. Zinc		11 0	39 6
Picrotoxin	1-80 gr.	7 0	24 0
Podophyllin	1-8 gr.	5 0	16 0
,,	1-4 gr.	5 0	16 0
,,	1-2 gr.	5 6	18 0
,, Comp.		8 0	28 0
Quinine, Bi-Sulphate	1-4 gr	5 0	16 0
,, ,,	1-2 gr.	5 0	16 0
,, ,,	1 gr.	5 0	16 0
,, ,,	2 gr.	7 6	26 0
,, ,,	3 gr.	10 6	38 0
,, ,,	4 gr.	13 0	48 0
,, ,,	5 gr.	16 0	60 0
,, Sulphate	1-4 gr.	5 0	16 0
,, ,,	1-2 gr.	5 0	16 0
,, ,,	1 gr.	5 6	18 0
,, ,,	2 gr.	8 0	28 0
,, ,,	3 gr.	11 0	40 0
,, ,,	4 gr.	14 0	52 0
,, ,,	5 gr.	17 0	64 0
,, Comp. (Anti-malarial)		15 0	55 6
Rhubarb Comp., B.P.	5 gr.	7 0	24 0
,, ,, and Blue Mass	5 gr.	7 0	24 0
Rhubarb, Ipecac. and Soda		7 0	24 0
Salicylic Acid	2 gr.	7 0	24 0
,, ,,	5 gr.	11 0	39 6
,, Comp.		16 6	63 0
Soap Comp., B.P.	5 gr.	8 0	29 0
Squill Comp., B.P.	5 gr.	5 6	18 0
Strychnine	1-50 gr.	5 0	16 0
Zinc. Phosphide	1-4 gr.	7 0	24 0
,, ,,	1-2 gr.	9 0	32 0
,, Valerianate	1 gr.	8 6	30 0

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NOTE ON LINIMENTUM TEREBINTHINÆ AND SAPO MOLLIS.*

BY EMERITUS-PROFESSOR REDWOOD.

It is evident from the correspondence that has taken place, and much of which has been published, respecting the turpentine liniment of the last British Pharmacopœia, that difficulty has been experienced by many pharmacists in producing this preparation in a uniform and satisfactory condition. It might be inferred from the number of communications which have appeared in the journals on this subject, and the anxiety that has been expressed to obtain information with regard to the characters which the liniment was intended to present, and the best mode of ensuring its production in full possession of those characters, that it is a preparation frequently prescribed, and to which considerable value is attached. It is therefore the more desirable that all that is practicable should be done to remove the difficulties hitherto experienced in manipulating according to the official formula, and if necessary to point out means by which at a future time the formula may be amended.

I have found it necessary in dealing with the subject to make special reference to the liniment, and also to the soap used in making it, and I purpose treating of both separately.

Linimentum Terebinthinæ.—Previous to the publication of the British Pharmacopœia in 1864, there were three different formulæ for the liniment in the three official Pharmacopœias of London, Edinburgh and Dublin. The London formula differed only from that of the present Pharmacopœia in the omission of the water, while the Dublin formula prescribed turpentine and resin ointment, and the Edinburgh ordered those ingredients together with camphor. During the compilation of the first British Pharmacopœia, the Dublin formula was admitted in preference to the others, the Irish committee in this instance, as in others, having prevailed over their associates, so that the Pharmacopœia when produced in 1864 was found to be better suited for the use of Irish than of English or Scotch physicians. In England especially the resinous liniment was objected to, and therefore in the edition of 1867 the London formula without change was substituted for the other. The liniment thus prepared, however, was not yet quite satisfactory. It had some of the elements of an emulsion, but it lacked one of them, namely water. Still it was preferred to its predecessor, there sinous character of which was decidedly objectionable.

In preparing, with others, the present edition of the Pharmacopœia I undertook some experiments with the view of improving the character of turpentine liniment. The object was to improve its pharmaceutical character with the least possible alteration of its therapeutical properties. It was found that by mixing the soft soap with an equal quantity of water, and then adding the turpentine and camphor in the way, in which a pharmacist would naturally proceed for the production of an emulsion, but which need not be described here, a good and satisfactory result could be obtained. Just one small point of manipulation, however, I may perhaps be allowed to notice, because the want of sufficient attention to it has caused my failing once or twice in experiments I am about to describe. There are emulsions the successful production of which not only require the use of a pestle and mortar, but also the judicious selection of such, and especially of a proper pestle. The case in question affords a striking illustration of this, for unless a broad, rather flat-faced pestle that fits the curvature of the bottom of the mortar, be used, the difficulty of making turpentine liniment will be greatly augmented.

Availing myself of such efficient means, I satisfied myself and my editorial colleagues that the formula with the alteration indicated yielded a satisfactory result in the form of a thick creamy emulsion. It was, therefore, with others, submitted to the Pharmacopœia Committee of the Medical Council, and approved by them.

I should here state that the soap used in my experiments had been made in my laboratory, and had been there for several years. I have every reason for believing that it was a genuine olive oil soap of good quality, but I do not know, nor have I now the means of ascertaining, what its exact condition was in regard to alkalinity, or in other respects, for all that remained of it has since been used up. As the liniment produced with it was not unduly thick or pasty, I conclude that the soap was not excessively alkaline.

Such then is the history of what was done in reference to this liniment during and previous to the preparation of the present Pharmacopœia.

Turning now to the statements which have been published in the journals during the last twelve months, I find that whilst some operators have either failed to get, or have experienced difficulty in getting, satisfactory results in operating according to the official formula, others have succeeded to their entire satisfaction. The prevailing opinion seems to have been, especially as expressed in the latter part of the discussion, that although it is certainly possible to get a permanently emulsive product by the official process, this may be either thin or thick, liquid or pasty, according to the nature of the manipulation adopted, or other unexplained cause. Under these circumstances an appeal has been made by dispensers and journalists for some authoritative statement as to what the condition of this liniment is intended to be.

Now I have no authority to do more than to explain, as I have just done, the part which I and others have taken with reference to the official formula, and to offer any suggestions that may have been prompted by the results of experiments which I have recently made.

I observe that several of those who have described the results of their operations in preparing this liniment state that they have used sapo mollis, B.P., but I have not found any representation of the grounds upon which that statement is made. It seems desirable therefore that reference should be made to this part of the subject.

Sapo mollis.—The definition of soft soap as given in the Pharmacopœia is not so complete and explicit as that of either of the other official varieties of soap. I think it must be admitted also that in one respect it is not quite correct. It has been usually assumed that soft soap necessarily contains uncombined alkali, either caustic or carbonated, resulting from the fact that there is no recognized method by which the soap can be separated from

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, March 9.

the excess of alkaline liquor used in producing it, such as is adopted in the manufacture of soda soaps. Consistently with this view the Pharmacopœia makes no allusion to the alkalinity of soft soap, and if in its production all excess of alkali is retained, it might be expected that this would be a variable quantity. On reading the published account of the uncertain results obtained by different operators who have endeavoured to follow the official instructions for the production of turpentine liniment, it has always appeared to me probable that a variable extent of alkalinity in the samples of soap used might account for much at least of the discrepant results. My experience, however, has not for some time past extended to the characters and properties of the soft soaps of commerce, until this inquiry caused me to renew my acquaintance in that direction.

Having procured several samples from different sources, wholesale, retail, and manufacturing, of *Sapo mollis*, *B.P.*, the first thing that struck me was the marked green colour which they all, but not all equally, presented. Their appearance in this respect differed entirely from that of any sample that I have ever made or seen produced according to the Pharmacopœia description. Yet the first character indicated in the Pharmacopœia for soft soap is "yellowish-green." In the face of this therefore, I could hardly take exception to the colour, although I might be inclined to think that it had arisen from a complacent acquiescence with the dictum of authority, unless indeed the dictum arose from a too complacent reliance on the observation of a pre-existing practice. In the former case the character, as given in the Pharmacopœia, must have been an overlooked misprint, since 1867, for "yellowish-white," which was the character given in the edition of 1864, and also in the London Pharmacopœia. In any case there appears to be an error, to the commission of which I suppose I must plead guilty, although I have no recollection of the facts as they occurred in 1867. But why have the critics never noticed this, for I presume they have had commercial soft soap before them, which I have not until now? The error might be of some importance, because hemp seed oil is said to be used in making soft soap, and to yield a green soap,* while we know that olive oil soap is white or yellowish-white. As the case stands there may be a possible doubt by manufacturers between the correctness of the specified character and that of the prescribed oil. Some further investigation may with advantage be directed to this point.

Another character given in the Pharmacopœia is that the soap is "soluble in rectified spirit." This is important, because although it is reconcilable with the presence of uncombined caustic alkali it completely excludes the carbonate. In pursuing the examination of the various samples of commercial soft soap, represented as official, I have found none of them to be perfectly soluble in rectified spirit. They all contain a little carbonate of potassium, the quantity varying from 1·4 to 2·8 per cent. of K_2CO_3. What has very much surprised me has been that all the samples I have examined have been free from uncombined caustic alkali, as indicated by the addition of a drop of phenol-phthalein to a cold filtered alcoholic solution of the soap. It may perhaps be considered that the presence of carbonate, which the official character excludes, is less objectionable than that of caustic alkali, which the same character may admit, and this no doubt would be so with reference to some possible applications of the soap, perhaps even to all.

There is one obvious advantage resulting from the absence of free caustic alkali in commercial soft soaps, which is that it is easy to prepare from them a neutral soap, by dissolving in rectified spirit and then distilling off the spirit. I commend this method to pharmacists, and the use of such soap for pharmaceutical purposes where a neutral soft soap is required. I have proceeded in that way with the view of getting a soap of definite composition, that would yield turpentine liniment in a more uniform condition than it is possible to get it in by the use of soft soap in its ordinary commercial state.

It must be borne in mind, however, that the oil used in the soap may be in fault, that some oil, other than olive, such for instance as colza oil, may have been used, and as colza oil yields by saponification brassic acid, which has a different composition from oleic acid, it is possible that this may form a soap having an emulsifying power different from that of olive oil soap.

In the experiments I have made by using various samples of soft soap for the production of turpentine liniment, I have found that those samples which have contained the largest proportions of carbonate of potassium, as well as samples of my own preparation which have contained much free caustic alkali, have yielded the liniment in a thicker, more pasty, condition than it has been in when a neutral or nearly neutral soap, has been used. The result, however, largely depends on manipulation. If carefully and well prepared with neutral or nearly neutral soap, the product will be too thick to admit of its being easily put into a bottle with a narrow neck; it should be put into an open-mouthed bottle, because after standing for some days it usually becomes more liquid, and too much so to admit of its being conveniently kept in a covered pot.

Samples of both neutral and alkaline soaps, an of the liniment made with them, are on the table. Among them is a sample of soft soap which I only received yesterday, after my paper had been prepared, from a manufacturer to whom I had not previously applied. This sample differs from all the other commercial samples I have obtained in being free from the green colour on which I have commented. It does not therefore accord with one of the characters specified in the Pharmacopœia, but it nearly, if not entirely, agrees with what I think that character ought to be. In common with the other commercial samples it is free from caustic alkali but contains a little carbonate. As some of our members who are interested in the subject of this paper may desire to obtain a soft soap that possesses these characters I may mention that this is from the well-known firm of Knight and Son, of Silvertown Soap Works.

Returning now to the special purpose of this inquiry I may state, as the conclusion I have arrived at, that the official formula for *Linimentum terebinthinæ* yields a thick permanent emulsion, well suited for its intended use, if prepared with a soap that is neutral or nearly free from alkalinity; but that the definition of *Sapo mollis*, as given in the Pharmacopœia, requires correction and otherwise admits of improvement.

[*The discussion on this paper is printed at p.* 753.]

* Allen's 'Commercial Analysis.'

A CONTRIBUTION TO THE PHARMACOGNOSY OF STROPHANTHUS.*

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Strophanthus, a drug which latterly has come into extensive use as a remedy in affections of the heart, was introduced by Professor Fraser, his researches having reference to the seeds of a particular species known as *Strophanthus Kombé*, the Kombé arrow poison. From these seeds Fraser isolated a crystalline bitter principle, a glucoside, which he named strophanthin. From *Strophanthus hispidus*, DC., Hardy and Gallois subsequently isolated a crystalline bitter principle, neither of a glucosidal nor alkaloidal nature, but possessing all the toxic properties of Fraser's glucoside, which they termed strophantine.

With reference to the fruits and seeds, not only of the species already mentioned, but of the whole genus, the botany of the subject is by no means at present sufficiently clear to enable pharmacists to distinguish with precision the one from the other, and it appears to be questionable whether poisonous seeds, possessing undoubtedly the physiological activity described by Fraser, may be and are not collected from species other than the two already experimented upon by the above gentlemen. Professor Oliver has stated that the fruits entirely correspond in the two species; it is, however, generally accepted that the follicles yielding seeds with greenish-brown hairs belong to the Kombé plant, whereas those yielding seeds with brown hairs are yielded by *S. hispidus*.

In the absence therefore of more exact botanical information, the author does not presume to say from what species the seed used in the experiments which follow may have been yielded, beyond that it was collected in East Africa and is the drug which has latterly been used in this country with marked success.

I. Introduction.

Strophanthus† is the name of a genus of tropical shrubs belonging to the natural order Apocynaceæ, natives of Africa and Asia, of which there are several species. The seeds of some species are used by the native tribes of various districts in the preparation of an arrow poison, which has been met with in Africa at Kombé, in the Manganja country, near the Zambesi in the south east, in the Shiré Valley, in the Gaboon district, in Guinea, and in Senegambia. In the Gaboon district it is called "inée," "onaye," or "onage."

Botany of the Genus.—Flowers in terminal heads; corolla funnel shaped, its throat partially closed by ten scales, its limb divided into five long tail-like segments; the style thread-like, dilated at the top with a cylindrical stigma; the fruit a double follicle.‡ "Folliculi oblongi vel elongati, duri, divergentes vel divaricati. Semina compresso-fusiformia, apice in aristam longe plumosam producta, inferne coma decidua appendiculata (rarius ecomosa?). Arbusculæ v. frutices sæpe scandentes, glabri pubescentes v. villosi. Folia opposita, pennivenia. Cymæ terminales, nunc dense paucifloræ, nunc corymbosæ multifloræque. Flores speciosi varius parvi, albi flavicantes aurantiaci rubri v. purpurei."* The various species (some eighteen) of this genus have not as yet been described by botanists with precision, the plant yielding the Kombé arrow poison being referred by Professor Oliver, of Kew, to *Strophanthus hispidus*; but after a more minute examination to a distinct species which he has named *Strophanthus Kombé*.

Description of Strophanthus Kombé.—Dr. Kirk, H.M. Consul at Zanzibar, has described the plant as follows† :—"The plant is a woody climber, growing in the forest both of the valley and the hills, and found at various places between the coast and the centre of the continent above the Victoria Falls and the Zambesi. The stem is several inches in diameter and rough outside. The plant climbs up the highest trees and hangs from one tree to another like a bush-vine. The flowers are of a pale yellow, and last for but a short time during the months preceding the first rains of the season (October and November)."

Professor Oliver's description is as follows‡ :—"Climbing shrubs with dense rough branches (in the young state hairy), leaves shortly petiolate, broadly elliptical with obtuse apices (in the young state rough and hairy on the upper surface, tomentose below), inflorescence in hairy cymes with few flowers, with linear lanceolate caducous bracts, the linear acuminate lobes of the calyx being shorter than the tube of the corolla. Habitat South Tropical Africa, Zambesi land. [Our flowering specimens, although not all that could be wished, I think justify the separation of this plant from *S. hispidus*, DC., of West Tropical Africa, one of the poisons of the Nigritania. *S. Kombé* differs in the few-flowered inflorescence and the narrower (linear, not lanceolate) and shorter calyx lobes, which do not reach to the narrow sinuses of the throat of the corolla of *S. hispidus*, the firmer texture of the calyx and bracts and the early fall of the latter appear minor distinctions. The follicles entirely correspond in the two species; follicles 9 to 12 inches long, or rather longer, glabrate, dark brown and longitudinally striate when dry, narrowed above into a short appendix terminating in a subpeltate disc $\frac{1}{3}$ of an inch in diameter]."

Fruits and seeds of strophanthus, kindly submitted to the author by several gentlemen for the purpose of facilitating this investigation, presented characteristic difference in the shape and ripeness of the seed, length and arrangement of the comose appendages, and in other characters. One sample was totally different in structure from the rest.§ In the descriptions of the some eighteen species already described by botanists no detailed description is obtainable concerning the nature and characters of the seeds, hence the difficulty experienced in discriminating them. Without authentic specimens of

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, March 9.

† From the Greek στρέφω, to twist, and ἄνθος, a flower, in allusion to the manner in which the segments of the corolla are twisted together before expansion.

‡ 'Treasury of Botany.' Part II.

* 'Genera Plantarum,' Bentham and Hooker, vol. ii., Part II., 1876.

† *Journal of Anatomy and Physiology*, 1873, vol. vii., p. 140. Dr. Fraser.

‡ 'Icones Plantarum,' No. 4, 1870.

§ The author alludes to a sample of seeds forwarded to him as *Strophanthus*, which he is inclined to refer to a species of *Wrightia*, an allied genus of plants belonging to the same natural order (Apocynaceæ), possessing similar habits, fruit and seed.

pods, leaves, flowers and seeds of the *Kombé*, *hispidus* and other species of *Strophanthus*, it will therefore be impossible to assign the proper name and identify the numerous kinds of seed which in due course may probably be poured into commerce.

Collection of the Fruit.—The fruit is ripe in June, and is collected by the natives, who separate the rough dark outer coat (the epicarp and mesocarp, popularly termed "husk") before drying it, preserving the more leathery inner covering (the endocarp) containing the seeds; hence the tawny appearance of the strophanthus follicles, or pods, at present in commerce, due to the dark-coloured husk having been removed before drying, thus consisting only of endocarp and the comose seeds contained within. Owing to their poisonous nature, great difficulty, it appears, is experienced in inducing the natives to procure these fruits.

Mr. Thomas Christy, informs me that the fresh fruits are fleshy, and that in the separation of the husk by the natives previous to drying, a certain amount of watery juice (which afterwards assumes an oily appearance) is lost; also that from 3 to 4 cwt. of the fresh pods only yield 1 lb. of seeds, and that it is generally accepted that the fruits yielding seeds with comose appendages of a white colour are considered to be obtained from the Kombé plant, whereas those yielding seeds with brown-coloured appendages are from *S. hispidus*.

Preparation of the Arrow Poison.—The method adopted by the natives in poisoning their arrows, is as follows:—Before extracting the seed from the fruits, they dig a hole in the ground, so that they can bury the comose hair attached to the seed (for fear of its flying in their eyes),* they then coarsely grind the seeds, and mix it into a paste,† which latter constitutes the poison with which the arrows are smeared. In another description, furnished by an African agent and collector,‡ it is stated that the natives, having first cleared the seeds of their hairy appendages, then pound them in a mortar till reduced to a pulp, at which point they add a little water; in applying the latter they use the bark of a species of *Tilliaceæ*, the sap of which being pressed out along with the water tends to make the Kombé more adhesive, so that it does not peel off from the arrow in event of its meeting a bone when sent into the animal. The poison thus prepared is spread upon the shaft to the extent of about six inches. Game wounded by an arrow thus poisoned dies at once, seldom being able to move a hundred yards. The flesh is eaten without any evil effect accruing. The only precaution is to squeeze the sap out of a branch of the baobab tree into the wound made by the arrow, which is said to mitigate any evil effect that might result from the poison being more plentiful in the vicinity of the wound.

Chemistry.—According to the researches of E. Hardy and N. Gallois,§ the seeds of *S. hispidus* contain a crystalline principle (neither of an alkaloidal nor glucosidal nature), which they named "strophantine," soluble in water and in alcohol, but insoluble in ether, chloroform, benzol and petroleum spirit. Professor T. Fraser states that he has isolated a crystalline active principle from the seeds of *S. Kombé*, representing 8 to 10 per cent. of the seeds, which he has named "strophanthin." It is not precipitated by the ordinary reagents for alkaloids, does not contain nitrogen, and when heated with dilute sulphuric acid it yields glucose, and a body insoluble in water, but very soluble in rectified spirit, and having a strong bitter taste; this latter he terms strophanthidin.* The process adopted for the isolation of strophantine by Hardy and Gallois was as follows:—

The seeds deprived of their hairs were powdered and macerated in alcohol slightly acidulated by hydrochloric acid, the alcoholic tincture filtered and evaporated to the consistence of an extract on a water-bath, and then treated with cold distilled water. The solution left to evaporate spontaneously, yielded white shining crystals which were purified by a second crystallization.

The hairs of the seeds submitted to the same treatment by Hardy and Gallois, yielded also a crystalline alkaloid, which they termed ineine — not possessing the same physiological action as strophantine.

Pharmacological Action† (Fraser).—The pharmacological action of strophanthus appears to be an extremely simple one; it is a muscle-poison. However introduced into the body, it increases the contractile power of all striped muscles, and renders their contractions more complete and prolonged. In lethal doses, it besides destroys the capacity of the muscle to assume the normal state of partial flaccidity, and causes the rigidity of contraction to become permanent, and to pass into the rigour of death. As a result of the action on muscle, the heart is early and powerfully affected. It receives a larger quantity in a given time than any of the other muscles in the body, and, therefore, probably it is that strophanthin affects its action more distinctly and powerfully than the action of the other striped muscles. Indeed, by regulating the dose, a very distinct pharmacological influence may be produced upon the heart, while the other muscles remain apparently quite unaffected.

(1) Strophanthus acts primarily upon the heart, and produces, as the final result of this action, paralysis of that organ with permanence of the ventricular systole; (2) Pulmonary respiration continues in cold-blooded animals for several minutes after the heart is paralysed; (3) The striped muscles of the body are acted upon; twitches occur in them; their tonicity is exaggerated; and, finally, their functional activity is destroyed, the muscles being then hard, and, soon afterwards, acid in reaction; (4) The reflex function of the spinal-cord is suspended soon after the heart is paralysed; but the motor conductivity of the spinal-cord and of the nerve-trunks continues after the striped muscles of the body are paralysed; (5) The lymph-heart of the frog continues to contract for many minutes after the blood-heart has been paralysed.‡

II. Preliminary Experiments.

The fruits and seeds operated upon were presented to the Owens College Materia Medica Museum by Mr. T.

* *British and Colonial Druggist*, October 16, 1886, p. 413 (Christy).

† 'Christy's Commercial Plants,' No. 9, p. 54.

‡ *Chemist and Druggist*, January 15, 1887 (Burroughs Wellcome).

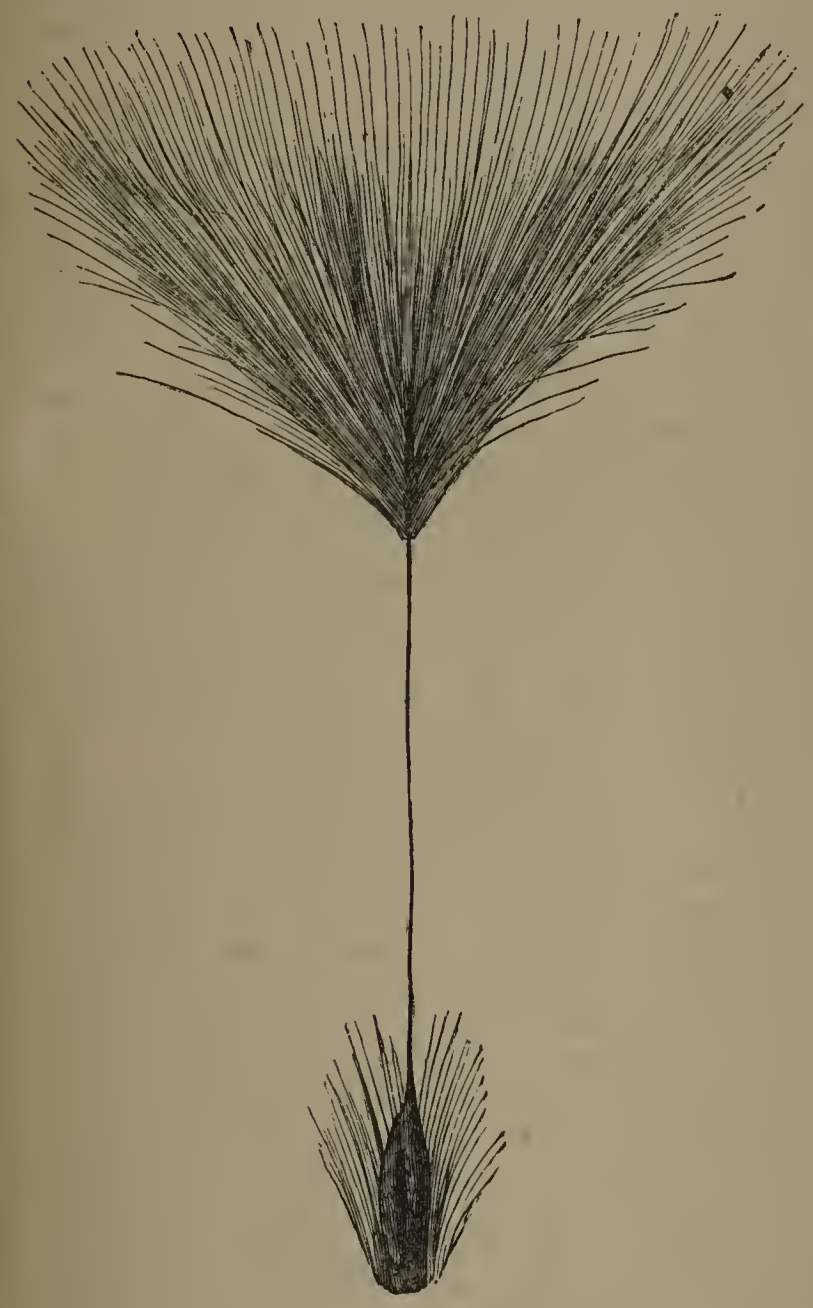
§ *Pharm. Journ.*, [3], vol. vii., p. 756.

* *British Medical Journal*, November 14, 1885.

† *British Medical Journal*, November 14, 1885. [The experiments being conducted with the rectified spirit extract of the *S. Kombé* seed.]

‡ *Pharm. Journ.*, [3], iii., p. 524.

Christy, who informs me that they were collected in East Africa. One of the seeds I forwarded to Mr. E. M. Holmes for his opinion concerning it, who, with his usual courtesy, replied as follows :—"The seed coated with hair which you have sent corresponds with those from Lake Nyanza, East Africa, which I refer doubtfully to *S. Kombé*. The seeds of *S. hispidus* are chestnut-brown." The accompanying figure is illustrative of the kind of



seed used: the hairs on the seed itself being *deciduous* they are apt to pass unobserved—unless the seed be withdrawn from the pod with great care. From Bentham and Hooker's description this character, however, is common to the genus (*inferne coma decidua appendiculata* (rarius *ecomosa*?)). The comose appendages were of a white colour.

One of the dried husked fruits, 12 inches in length (containing well-developed ripe seeds of a greenish-brown colour), weighed 14·069 grams; separated into seed, comose hair and endocarp, the following numbers were obtained :—

Weight of seeds (159)	=5·99 grams	=42 per cent.
Weight of comose hair	=3·119 grams	=22 per cent.
Weight of endocarp	=4·96 grams	=35 per cent.
	14·069	

The Seed.

The quantity of seed necessary for analysis was well powdered and exposed to a current of dry air for several hours.

I. *Petroleum Ether Extract.*—Eight grams of the powder were macerated with 80 c.c. of petroleum ether for forty-eight hours, frequently shaken, and allowed to subside. The clear liquid extract was poured off, the residue thrown upon a filter and washed with petroleum ether until the liquid extract was brought up by the filtrate to 80 c.c. The latter was of a bright yellow colour with a tinge of green, and 40 c.c. evaporated in a tared dish on a water-bath until free from petroleum ether yielded an oily residue weighing ·834 gram = 20·8 per cent.

This oily residue was of a bright yellow colour with a tinge of green, gave a permanent stain with bibulous paper, possessed a bland oily taste absolutely free from bitterness, remained perfectly clear and liquid, and possessed the characters of a fixed oil. A small portion treated with H_2SO_4 on a white porcelain tile gave a brown coloration, with H_2SO_4 and $K_2Cr_2O_7$ a green coloration. The oil after standing a few days deposited some bright colourless pyramidal crystals, free from bitterness. The crystals, heated upon a piece of platinum foil, fuse, char and burn with a blue flame like sulphur, leaving no ash or residue.

II. *Absolute Ether Extract.*—The residue of No. I., after being well washed with petroleum ether and dried in a current of warm air, was macerated with 80 c.c. of absolute ether (·720) for forty-eight hours, frequently shaken, the clear extract drawn off, the residue thrown upon a filter and washed with ether until, by the addition of the filtrate, the extract measured 80 c.c. The latter was of a green colour, and 40 c.c. evaporated on a water-bath until free from the solvent yielded a soft fatty residue of a dark green colour (which consisted chiefly of chlorophyll) weighing ·037 gram = ·9 per cent. The fatty residue was boiled with a small quantity of distilled water and filtered, the filtrate was free from bitterness, and gave negative results with Meyer's solution and (after having been boiled with a few drops of dilute sulphuric acid) with Fehling's solution. [From my earlier experiments I found that unless the ether was perfectly free from alcohol and water, a considerable quantity of the bitter principle was likewise removed in this extraction; also that the ether supplied to me commercially as absolute (·720) required considerable rectification (shaking with water, and redistillation over chloride of calcium and quicklime, and final digestion with sodium) before being fit to use for this purpose.]

III. *Absolute Alcohol Extract.*—The residue of No. II. was well washed with ether, carefully dried, and macerated in absolute alcohol (·800) for forty-eight hours, with frequent shaking, the clear liquid extract poured off and the residue thrown upon a filter and washed with absolute alcohol until, by the addition of the filtrate, the extract measured 115 c.c. The latter was of a light straw colour, and the alcohol having been distilled off the dried residue weighed 0·13 gram = 1·6 per cent., which, upon removal, readily powdered, was of an intensely bitter taste, and soluble in water, one milligram dissolved in a fluid ounce of distilled water, imparting a decided bitterness. A small portion dissolved in water gave no indication of the presence of an alkaloid on the application of the usual reagents for detecting alkaloids; no precipitate with ammonia; neither was anything removed by the agitation of the ammoniacal liquid with ether, chloroform or benzol; neither did these solvents remove anything from the aqueous solution of the alcoholic residue previously rendered acid. It was not precipitated by acetate of lead. A portion was dissolved in water and boiled with Fehling's solution with no

perceptible reduction of the latter; another portion dissolved in water and boiled with a little dilute sulphuric acid amply reduced Fehling's solution however, thus indicating the presence of a glucoside. Attempts to crystallize the glucoside from both aqueous and alcoholic solutions by spontaneous evaporation were, however, futile, it being left, in each case, in an amorphous state. With the view of further purification the yellowish-white powder was dissolved in a small quantity of distilled water, digested with recently ignited purified wood charcoal, evaporated to dryness and abstracted with absolute alcohol; the filtered extract evaporated on a water-bath left a residue, which, upon being scraped out of the dish, possessed the form of transparent scales, which, unless examined with a lens, might readily be mistaken for crystals. [In consequence of this result the author, with the view of obtaining the glucoside in the crystalline state, submitted 1·6 gram of the powdered seed to the process adopted by Hardy and Gallois (see Introduction), and found that it was impossible to evaporate, at the temperature of a water-bath, the acid alcoholic extract obtained (10 c.c. absolute alcohol +3 minims of hydrochloric acid used in extraction) without destroying (charring) the extracted matter (the oil excepted, this appeared to be unaffected). Another gram of the seed extracted in the same manner, but submitted to spontaneous evaporation, extracted with a small quantity of distilled water and allowed to evaporate, yielded an amorphous residue of intensely bitter taste, which, on purification by treatment with ether, appeared to be identical with that already obtained in the ordinary course of experiment III.]

These yellowish transparent scales, intensely bitter, unattainable in the crystalline state by these methods (due possibly to the presence of a minute quantity of impurity), were soluble in alcohol and in water, insoluble in benzol, ether and chloroform. As yet I have not been able to devise any good colour reaction or ready chemical test for this extremely bitter glucoside.

Another interesting feature in reference to the rectified spirit extracts of the seeds has been communicated to me by my friend Leopold Larmuth, Esq., M.B. (Lond.), who is working at the subject in the pharmacological laboratory of the Owens College. He finds that when the residues of the spirituous solutions are dissolved in water (the alcohol being evaporated off, as is customary, at a low temperature) and set aside for a few days, the resulting product undergoes some decomposition and becomes far more toxic than when first prepared. The explanation of this decomposition will of course require extended investigation. The fact however will justify my referring readers to the manner in which the natives poison their arrows (see Introduction); some analogous toxic decomposition probably occurring in the preparation. [The ultimate explanation and clearing up of this important topic foreshadows in the author's mind many important questions in reference to the proper method of preparing the tincture of the seed for use in pharmacy, such as whether or not an economy could be made in its preparation by previously exposing the seeds to the air in the form of a paste with water until this change has been effected?]

Several experiments have been made in this direction, the powdered seed being made into a paste with water and exposed for several days; the product when dried is of a browner colour than the original powder; it is still under investigation and will be the subject of a separate communication.

IV. *The Aqueous Extract.*—The seed residue from III. was exhausted with cold distilled water, and the liquid extract corresponding to 2 grams of the seed evaporated to dryness over a water-bath yielded a residue of a light brown colour weighing ·45 gram =22·5 per cent. When removed from the dish the residue readily powdered, and was intensely bitter to the taste: digested with absolute alcohol, filtered, and the filtrate evaporated to dryness, only a trace of bitter principle was removed. The original residue (·45 gram) was then dissolved in a drachm of distilled water and poured into a mixture of 2 ounces of absolute alcohol and 2 ounces of ether, set aside for a few hours, filtered from the precipitated albuminous matters, the alcohol and ether from the filtrate distilled off, and the residue dried upon a water-bath. The residue upon being scraped out of the dish consisted of yellowish scales identical in appearance with the glucosidal residue of III., possessing the same intensely bitter taste; it was insoluble in ether, chloroform and benzol, and tested with the usual reagents proved to be a glucoside. My friend, Mr. R. B. Wild, M.B., B.Sc., informs me that its physiological action on muscle is similar to that of the glucoside isolated in III. It weighed 0·058 gram=2·9 per cent. The albumen by difference, therefore, equals 0·392 gram=19·6 per cent.

V. Corroborative results were obtained by another method as follows. Some seed was powdered and macerated with 10 per cent alcohol for four hours, the extract strained through muslin and the residue exhausted by further maceration in similar menstruum until free from bitterness. The strained liquids were then treated with lead acetate to precipitate albuminous matters, heated to the boiling point, filtered, excess of lead removed from the filtrate with sulphuretted hydrogen, again filtered, and the filtrate evaporated to dryness over a water-bath in a capacious flat dish. [Strophanthus preparations are very prone to char and develop a saccharine odour on the application of heat, hence a temperature a little under 100° should be employed in their evaporation.]

The dried residue was extracted first with ether and then with absolute alcohol, until the latter ceased to dissolve anything. The alcoholic extract was intensely bitter, and left on evaporation a residue corresponding in bitterness and in its glucosidal nature to that obtained in III. The residue insoluble in alcohol was soluble in water and intensely bitter. It gave the reaction of a glucoside and corresponded to that obtained in IV. (after solution in water and purification by the alcohol and ether method).

Résumé.

		Per cent.
I. Petroleum ether extracted fixed oil.		20·8
II. Ether extracted chlorophyll and fat		·9
III. Absolute alcohol extracted bitter glucoside*	1·5	4·4
IV. Water extracted bitter glucoside*	2·9	
Albuminous matters		19·6
Insoluble residue		54 3
		100·0

* 1 in 380,000 of water imparts a decided bitterness.

Remarks.

Strophanthus seeds contain an extremely bitter glucosidal active principle intimately combined with an excessively large quantity of albumen—which latter is of such a nature that from aqueous solution basic acetate of lead, tannin, mercuric chloride, or the addition of two volumes of absolute alcohol, only partially precipitate it. Amylic alcohol is capable of removing the glucoside from aqueous extracts by agitation, but owing to the emulsion it forms with the albumen, the process of separation is very tedious. In reference to the rectified spirit tincture, that by Fraser's revised process of 1 in 20 is a great improvement upon the original 1 in 8 strength, which latter left the marc in a very unexhausted state.*

From experiments made upon the tincture by the revised process, I find that the rectified spirit exhausts the seed of about 7·0 per cent. of extractive of an albuminous nature, leaving about 1·5 per cent. of the bitter principle in the marc, and further that the loss of the latter would not be remedied by increasing the quantity of the menstruum, due in the author's mind to the coagulating effect the spirit exerts upon a certain portion of the albumen with which that portion of the bitter principle is associated. By lowering the alcoholic strength of the menstruum it could readily be effected, yet not without the extraction of a corresponding large quantity of abuminous matter—which would prove highly objectionable, however, since the latter by over-dilution with water is, on escape of the alcohol, very prone to decompose and develop a very fœtid odour.

By previous writers it has been observed that when the 1 in 20 tincture is mixed with an equal volume of ether opalescence occurs. This appearance would probably be due to the partial separation of albuminoid material.

Comose Hair.

I. *Alcohol Extract.*—Eight grams cut into small pieces and pounded in a mortar (the latter operation producing little visible effect upon it) were exhausted with 80 c.c. of alcohol (·800) acidulated with three drops of hydrochloric acid by maceration for forty-eight hours, filtering and washing the residue with alcohol. The filtrate and washings evaporated on a water-bath left a brown resinous residue, weighing ·055 gram = 0·68 per cent. This residue treated with a small quantity of distilled water was practically insoluble, the solution, however, filtered off and submitted to spontaneous evaporation, left a slight brown coloured residue, very slightly bitter. On re-dissolving in water negative results were obtained with alkaloidal reagents; it appeared to contain only a very minute quantity of bitter glucoside.

The resinous residue in the filter paper after being dried was treated with ether, in which it was found to be insoluble. Upon re-dissolving it in absolute alcohol a few drops of the solution mixed with half a test-tubeful of water gave a beautiful blue fluorescence, accompanied with opalescence; it had a bitter taste.

II. *Aqueous Extract.*—The residue from I. was extracted with water and found to be free from bitterness.

* From results ascertained abroad, half a fluid drachm of the aqueous extract of a 1 in 8 seed marc (corresponding to 40 grains) killed a cat in twenty minutes.

Endocarp.

Alcoholic Extract.—Four grams of the powdered endocarp were macerated in 40 c.c. of absolute alcohol for forty-eight hours. Ten c.c. evaporated to dryness on a water-bath yielded a residue of ·013 gram = 1·3 per cent, which, treated with a little distilled water, dissolved, yielding a solution with only a slight bitter taste, free from tannin, and gave no reaction with Meyer's solution.

Root.

The root, freed from the cortical portion, was powdered (the operation excited sneezing) and 3 grams exhausted with absolute ether, the residue, on evaporation of the extract, weighed ·021 gram = 0·7 per cent. of a substance resembling caoutchouc, soluble in chloroform, insoluble in absolute alcohol. The residue of root, exhausted with absolute alcohol and evaporated to dryness, yielded 0·033 gram = 1·1 per cent. of an intensely bitter substance of a brownish colour, giving negative results with alkaloidal reagents; it gave the reaction for a glucoside. The root residue from the alcoholic extract, exhausted with water, filtered and evaporated to dryness, left a residue, weighing ·23 gram, intensely bitter. The aqueous extract of the residue has not yet been examined.

Husk.

The author contemplates the publication of the examination of the husk in the form of a separate paper at some future date. It possesses a physiological activity somewhat similar to that of the seed, but in less degree.

In conclusion, I beg to thank Messrs. Burroughs and Wellcome for the courtesy with which they submitted for my inspection one of the poisoned arrows, and for their kindness in furnishing me with various supplies of seed.

[*The discussion on this paper is printed at p.* 754.]

SOME NOTES ON STROPHANTHUS.*

BY H. HELBING,

Apotheker to the German Hospital, Dalston.

The interest that strophanthus and its preparations have lately awakened has induced me to turn my attention to the pharmaceutical study of this drug. It is often the case that when a new medicament is introduced it appears in commerce in several different qualities, and there is frequently a wide difference in the manner in which the article is prepared by pharmacists. This is the case with strophanthus. I need only remind you that Professor Fraser at first recommended the preparation of the tincture of strophanthus in the proportion of 1 in 8 (*Brit. Medic. Journ.*, Nov 14, 1885), whereas Mr. Martindale advised making the tincture in the proportion of 1 in 20 (*Pharm. Journ.*, [3], xvii., 411). For my part, at that time I considered it advisable to prepare the tincture with proof spirit in the proportion of 1 in 20 (*Pharm. Zeit.*, Berlin, Jan. 15, 1887). Another firm sent out a tincture made from the whole pods, including the hairs and pod-lining. Finally, Professor Fraser advocates, now, a method of preparing the tincture of 1 in 20 made with recti-

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, March 9.

fied spirit, removing, previously, the fatty oil from the seeds by means of ether (*Brit. Med. Journ.*, Jan. 22, 1887). This diversity in the methods of preparation was, perhaps, of less consequence at that time, as strophanthus was more or less difficult to be obtained, and consequently less widely used than at present, and the material itself was probably not quite uniform throughout. It is now quite different, for strophanthus is at present to be had good and of uniform quality, and in such quantities as will probably suffice for years. I therefore think that it is necessary for all preparations to be uniform as far as possible, lest from the beginning physicians lose all confidence in a preparation of which they do not know the composition, nor exactly the amount of active principle therein contained.

The strophanthus which is now offered in the trade occurs in two different forms, either in pods or as clean seeds. The pods appear quite similar to one another, and, externally, are not in any respect different to those which have been used formerly. The quality of these pods is, however, not always the same, as will be seen from the following examination of them. Taking five similar pods from a large stock, I examined them carefully with the following results:—

Pod.	Weight of single pod.	Weight of pod-lining.	Weight of hairs.	Weight of seeds.	Per-centage of seeds in single pods.	Number of seeds.
I.....	216	89	77	50	23·15	303
II.....	334	142	86	106	31·76	294
III.....	188	65	44	79	42·04	201
IV.....	132	49	25	58	43·93	126
V.....	289	91	58	140	48·44	203
Sum total	1159	436	290	433		1127

All the weights are given in grains.

As sum total, the pods contain:—

Seeds	37·36 per cent.
Pod-lining	37·61 „
Hairs	25·02 „

The total percentage corresponds pretty accurately with that of the pods of last year which I examined in the same way. The results published in the (*Pharmaceutische Zeit.*, Berlin, Jan. 15, 1887) were as follows:—

Seeds	37·4 per cent.
Pod-lining.	35·6 „
Hairs	26·9 „

I here show the seeds and hairs of these five pods; they exhibit some peculiarities to which I consider myself justified in calling your attention, as a characteristic criterion of the quality of strophanthus pods. In spite of the great number of seeds contained in the pod labelled No. I., the weight of the sum of these seeds is the smallest, and it appears that they are all more or less spoiled and not adapted for the preparation of the tincture. It is a noteworthy fact that the colour of the hairs of the pappus coincides with the state of the seeds, the least heavy of the seeds having a dusky, dirty colour and the kernel having lost its pure white colour, while the hairs of the pappus are of a dirty yellow colour. In point of quality the pod labelled No. II. ranks better than No. I, but here also a similar proportion between the number of seeds and their weight is apparent; furthermore, the hairs are also of the same dirty colour. In the three other samples the number of the seeds was less, but their weight was greater, being between 40 and 50 per cent of that of the whole pods; these seeds were decidedly excellent. The quality of the pods and seeds may therefore in most cases be estimated by examining the colour of the hairs of the pappus, which is very characteristic; if these are white and bright the seed too is in good condition. If therefore the pods are sorted before being offered for sale, as is indeed the case, great care being taken by the firms to be sure of the good quality of their article, the number of inferior pods, which is always very small, is reduced to a minimum; yet for my part I prefer the clean seeds, which are also to be bought by themselves. The pods as met with in commerce would appear to be better adapted for the extraction of strophanthin and inein. Of the clean seeds, furthermore, there exist two kinds, both brought over by the East African Lakes Company from the Shiri Highlands. The usual kind, which may be denominated Kombé seed, is alone to be obtained in the market. The seeds are $1\frac{1}{2}$ to $2\frac{1}{2}$ centimetres long and 4 to 5 millimetres broad. They are more or less rounded off at the base, without, however, losing the distinctly pointed shape; towards the upper end they become suddenly very much narrower and end in the stalk of the pappus. They are flattened at the sides, and have a much more prominent keel-shaped ridge on one side than on the other; the seed is twisted slightly in the form of a spiral from the base to the apex. The colour of the seeds varies from a greyish green to brown, being more or less covered with numerous appressed silvery hairs of silky appearance.

The second kind of seeds, which I will call white strophanthus seed, is similar in form to the Kombé strophanthus, only the seeds are more densely covered with looser, longer, silky hairs, like a fur, so that the real shape of the seeds is not quite so apparent as is the case with Kombé seeds. The colour of the hairs of the seeds is much paler than that of the Kombé, and is almost white. I will pass by other kinds of strophanthus seeds, as, for instance, *S. hispidus*, of which the seeds are quite brown, with very short, slightly bristly hairs, and I will only mention as a curiosity that Mr. Thomas Christy once received some seeds professedly of *Strophanthus*, but which, by Mr. E. M. Holmes, to whom I submitted them, are considered to be probably those of *Holarrhena africana*, from which an alkaloid, conessine, has been prepared; the same that is mentioned in E. Merck's latest report as having been obtained by him from *Holarrhena antidysenterica*. I should like to present to you now a small sketch of the average proportions of the different seeds and their weight.

One hundred seeds from the pods now in the market weigh 35·75 grains.

One hundred seeds from the Kombé pods now in the market weigh 62·00 grains.

One hundred seeds from the white strophanthus now in the market weigh 57·00 grains.

These figures show that the clean seeds have evidently been carefully separated from the bad ones, and also that it is evidently safest to use selected clean seeds.

Turning now from the drug itself to the question of the best preparation of it for pharmaceutical pur-

poses, several points arise for consideration. First and foremost comes the question as to the durability of the preparation, and secondly, though almost equally important, that of the uniformity of the quantity of the various active principles contained in it. Then also the question arises how both demands are to find a practical solution. When I remind you of the various methods of preparing the tincture of strophanthus described in the beginning of this paper it will be at once apparent that various attempts have been made, but without, at least in my opinion, giving a satisfactory answer in the difficulty. If we adhere to Professor Fraser's last prescription, or indeed as regards any one formula for the preparation of the tincture of strophanthus, we find the following desiderata have been accepted universally without sufficient justification. I may therefore name them without further comment. They are :—

I. That the tincture be prepared with rectified spirit.

II. That the fatty oil be previously removed by ether.

III. That the proportion of the seeds to the tincture be as 1 : 20.

If the Kombé strophanthus seed is dried in the manner recommended by Professor Fraser at a temperature of 120° Fahrenheit a loss of weight takes place, of upwards of 5 per cent. The seeds thus dried and, after being powdered, treated with ether to extract the fatty oil, give from 1 oz. of seeds 142 grains or 32·45 per cent. of fatty dark green oil, which, at the usual temperature is a thick fluid, and of the specific gravity of 0·925 at 60° F. It is easily soluble in ether, less easily in alcohol, not at all in water, or much diluted alcohol. The residuum after exhaustion with ether produces on being dried at 100° F., from 1 oz. of seeds 294 grs., equal to 67·20 per cent. This dried mass I exhibit here ; it is a greyish white, rather fine and very mobile powder. I have treated it with rectified spirit of the specific gravity 0·838 at 60° F. in the proportion of its original weight (1 oz.), according to the recipe given by Professor Fraser, and I obtained the tincture as here shown ; in larger quantities it is slightly yellow, in smaller ones, as with this sample, colourless and exhibits all the properties described by Professor Fraser. I have labelled it a little further on in this paper as G-tincture. It struck me as very remarkable during the preparation of this tincture that the process of completely exhausting the seeds by means of spiritus rectificatus offered great difficulty, but that it was much easier to achieve this by employing diluted spirit. This, however, would utterly injure the tincture in point of durability. As I have myself observed, and also had corroborated by others, the residuum had always a bitter taste, and indeed it gave by continued treatment with alcohol also some more soluble substance, in spite of most careful working and with all the different methods of percolation and maceration that are usually followed. This circumstance induced me to compare my tincture with those offered in the market, and I was not a little surprised at the result of this comparison, which I beg to submit to your notice.

It is only of a relative importance to note the specific gravity of the tinctures in this table, as it allows of no conclusions as to the active principles extracted, the specific gravity being due to the concentration of the alcohol employed, and the larger quantity of extract in the first four samples is attributable to weaker alcohol having been employed. The last four tinctures have been probably prepared with the rectified spirit of commerce, still the difference in the extracted contents is doubly apparent. To my mind these results appear to indicate that the preparations either did not receive the necessary care, or that different qualities of seeds were used. In colour the tincture varies from being almost colourless to a green or yellow, which is very objectionable, for what would a physician think of a prepartion which bears a signature as being prepared in a certain clearly defined manner supposed to be uniform in all tinctures of the kind, but which appears in various different colours, so that at first sight, even without a closer examination, it is clear that there must be some diversity in the preparation ?

Sample.	Specific gravity at 60° F.	Residuum after evaporation.	Colour and fatty oils.
A . .	0·900	239	Little oil, greenish-yellow colour.
B . .	0·890	200	Some oil, yellow colour, like hock.
C . .	0·875	242	Little oil, yellow colour.
D . .	0·870	170	Very little oil, light yellow colour.
E . .	0·844	124	Little oil, greenish-yellow colour.
F . .	0·840	180	Colourless, only trace of oil.
G . .	0·840	120	Colourless, only trace of oil.
H . .	0·840	88	Colourless, only trace of oil.

All the weights are given in milligrammes.

Oil was always present more or less in the tinctures examined, but always so little that it could hardly be taken into consideration, varying from 5 : 15 mg. in the oz. For the detection of small quantities of oil in the tincture, it is necessary to know that it is often invisible in the process of evaporation. The reason is that it is too evenly dispersed throughout the tincture and extract, but if a little water be added during evaporation, the oil collects in one spot. If the dry extract is treated with water, which is simply poured over it, in the porcelain dish and carefully shaken around, and the fluid is poured off, the process repeated, then after the dish has become dry the pure oil is found to remain. The diversity in the percentage of extract obtained from the tincture of commerce seems to necessitate an attempt at uniformity and the fixing of a standard for the tincture. I believe, that, even with the greatest accuracy it is impossible to exhaust completely the seeds in the process of preparing the tincture. I had an opportunity of convincing myself of this, in a case of preparation of the tincture in a factory, where enormous quantities of seeds were employed, continued percolation always producing the same bitter taste.

Returning now to the white strophanthus seeds, I will mention that if treated in the same manner as the Kombé seed they show a loss during drying of 5 per cent. ; the percentage of oil is somewhat less, being 28·33 per cent. ; the oil is also of a green colour,

but a little paler. I take the liberty to call your attention to a peculiarity of the two oils. If they are heated on a water-bath, they lose their emerald-green colour, and change it for an opalescent brownish-red, as is shown by the two samples.

The tincture derived from these seeds is of the same nature and colour as that from Kombé seeds, and I could not obtain a stronger extract from the former than the latter.

Hoping that the results I have obtained may be conducive to a better knowledge of strophanthus, it would give me great satisfaction if they ultimately tend, in however small a degree, to help towards the fixing of a definite and more satisfactory formula for the preparation of the tincture, whereby a greater degree of uniformity may be obtained than is at present the case.

I cannot conclude my paper without returning my cordial thanks to all who have assisted me in my work, especially the officers of the Pharmaceutical Society, from whom I have met, although a stranger, with such a kind reception and great courtesy; to Messrs. Burroughs and Wellcome, who most kindly placed considerable quantities of the seeds and pods at my disposal to enable me to carry out my investigations.

In offering this paper to the Pharmaceutical Society, I do it in the hope that inasmuch as British enterprise has introduced this valuable remedy to the nations of both continents, so English pharmacy may be the first to devise the best possible method of preparing the tincture, and in respect to strophanthus also retain the advanced position which it is generally recognized to hold.

If my specimens should be considered to be of any interest, I would feel most happy to offer them for the Museum of the Pharmaceutical Society.

[*The discussion on this paper is printed at p.* 754.]

ELECTROLYSIS OF COPPER AND ZINC.

BY ALEXANDER SHAND.

The separation of copper from zinc or any other metal is much more easily and quickly conducted by electrolytic deposition than by the ordinary wet process. As the result of some experiments recently conducted, I have found that the electrolytic method is also much more accurate. In order to determine the accuracy of the process ·5033 gram of pure copper and ·5031 gram of pure zinc were dissolved in a little dilute sulphuric acid, and the solution made up to 1000·5 grams with distilled water at 15° C.

Of this solution, 100 grams, calculated to contain ·050304 gram of copper, and ·05028 gram of zinc, were weighed into a tared platinum basin, and the current from one Bunsen cell passed through the solution, the positive electrode being a platinum disc. The Bunsen cell exposed 140 sq. in. of zinc to dilute sulphuric acid specific gravity 1·12 at 15° C. The current was allowed to continue all night, the total time being about eighteen hours.

The solution in the basin was now poured into a beaker, and the deposited copper washed three times with distilled water, then three times with alcohol, and finally three times with ether. It was then dried in an air-bath at 80° C., allowed to cool in a desiccator and weighed.

Results of two estimations.

1st.	·0504	Theory requires	·0503.
2nd	·0503	„ „	·0503.

A large number of experiments showed that the most accurate results, in zinc estimations, are obtained by the following process. The zinc, being in the form of sulphate is nearly neutralized, if necessary, with potassic hydrate, free from aluminium; then add ammonium oxalate in excess. Maintain the solution at a temperature of 80° C. or 90° C. by heating with a steam- or water-bath, and pass the current from two Bunsen cells similar to the one used for the copper estimation. In a few hours the whole of the zinc is deposited as a pale bluish-white coating on the basin; which is washed with water, alcohol and ether, as in the case of copper, and then dried and weighed.

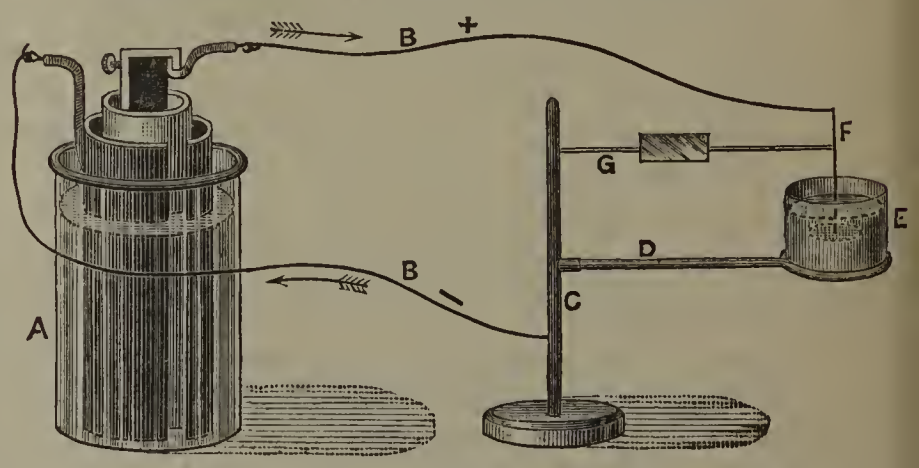
Results of two estimations.

1st	22·19 per cent.
2nd.	22·09 „

There are a number of practical details and precautions, most of which will occur to any who may be disposed to investigate this process. It is absolutely necessary that the analysis be carried out exactly as described above, and that the platinum basin be chemically clean. If the basin is heated directly with a flame during the process the zinc is deposited in a black powdery condition, and gives too high results. Should the acid in the battery be too dilute the zinc comes down in a crystalline state. In this condition it is very difficult to wash without loss, as some of the crystals become detached and are easily washed away. From ·4 to ·9 gram of the metal is the most convenient quantity to work with, as too large a quantity takes much longer to deposit. 1·5 gram of copper, for instance, takes thirty hours to completely deposit with the current from a single Bunsen cell.

The accompanying wood-cut will show a suitable arrangement of the apparatus for conducting the process.

Arrangement of Apparatus for Electrolysis.



A is a Bunsen cell with zinc-carbon couple. BB are the conducting wires, and the direction of the current is indicated by the arrows. C is a metallic rod fixed in a circular base; an ordinary retort stand does very well. D is a copper rod having a ring at the end on which the platinum basin, E, is supported. F is a platinum wire supported by the rod, G, and insulated by a piece of glass in the centre of the rod. At the lower end of the platinum wire, F, is a small platinum disc which dips under the surface of the solution in E containing the metal to be deposited. The other end of F is attached to the positive conducting wire, and the arrangement is complete.

The Pharmaceutical Journal.

SATURDAY, MARCH 12, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

MODERN PHARMACOLOGY.

THE address delivered at the opening of the Session of the Ulster Medical Society by the newly-elected President, Dr. WHITLA, dealt with a subject to which pharmacy is closely related, and in many parts with matters of considerable interest to pharmacists. The subject of the address was the present position and prospects of the domain of therapeutics. Regarding that branch of medical science as the one possessing most interest to the majority of the medical profession, Dr. WHITLA first referred to the opinions constantly expressed as to its want of progress and to the habit apparently fashionable in some quarters to lament that, whilst pathology, physiology, bacteriology, and every other "ology" are progressing with rapid strides, the treatment of disease remains pretty much in the same position that it was a quarter of a century ago. He therefore proposed to examine how far this view might be justified, in order that if true it might be ascertained to what extent there was a possibility of providing a remedy, and if untrue to expose the fallacy. For the purpose of such an inquiry, it was pointed out that much difficulty would be at once removed, if in place of the vague and somewhat shadowy conception of the meaning of the term therapeutics, it were recognized as including at least two distinct sciences. In addition to the "treatment of disease," there is the science of pharmacology, or of the action of remedies altogether apart from disease, and though the study of the effects produced by remedial agents upon healthy or normal physiological conditions may be regarded as a branch of investigation in its infancy, it has, since being called into existence by the creative genius of MAGENDIE, developed under difficulties sufficient to strangle the growth and progress of any other branch of science, and is now making enormous strides. Among the difficulties that this study has had to contend with, one of the most serious is the opposition raised to its prosecution in our own country by what Dr. WHITLA characterized as the morbid sentimentality and wicked ignorance of hysterical agitators. But notwithstanding the obstructive restrictions of a short-sighted legislature, pharmacological study has continued to enrich therapeutics, and to provide means of alleviating human suffering so as to constitute a lasting memorial to the truly scientific spirit of practical medicine.

As illustrations of the fact that in this way the solid foundation of a scientific treatment of disease is being permanently and surely laid, Dr. WHITLA selected from among a multitude of other evidence the researches of LAUDER BRUNTON upon the action of the nitrites; of FRAZER and CRUM BROWN upon strychnine; of continental investigators who have studied the actions of the chinoline series and of the mydratic alkaloids; of MATTHEW HAY, who has demonstrated the action of the saline group of cathartics, and other results obtained where the anti-vivisection mania has not retarded the progress of scientific research. And while it must be admitted that these results are not immediately revolutionizing the treatment of disease, it is equally certain that ground is being gained in that direction in two ways; first, by the introduction of new remedies of great power and value; secondly, by the possibility acquired of using the older remedial agents with far greater precision and effect, and precision is just the quality in which therapeutics has hitherto been deficient. To the advance in this direction chemistry is contributing results that are almost startling, as, for instance, the recently recognized relationship between physiological action and chemical constitution, in reference to which LAUDER BRUNTON has remarked that therapeutics having passed through the flint, the stone and bronze ages, is now entering upon the iron age. It is certainly a sign of progress to find the physiologist can now predict with almost unerring certainty that when once the chemist has succeeded in producing certain readjustments of the molecules of various carbon compounds, he will be able with the resulting compounds to produce certain definite physiological or therapeutical effects.

In addition to the aid thus rendered to pharmacology by chemical science pharmacy has also been of much help, especially by the advantages which the practical physician experiences in using the active principles of drugs, instead of the crude vegetable decoctions of former years. This alone would be evidence of progress, for the alkaloids isolated during the last few years have furnished a series of precise weapons which the scientific therapeutist can wield with a uniformity of result and certainty of action undreamt of in past times. The synthetical production of various rare and expensive principles by the pharmaceutical chemist also marks an era which is deserving of record, not only in regard to what has been done in this direction, but also by reason of its promise of future development. While acknowledging that in these respects the physician is deeply indebted to the practical pharmacist, Dr. WHITLA pointed out a development of modern pharmacy that he regarded as being not only far from an advance,

but calculated to retard the progress of the healing art, viz., the practice of large American and English drug-houses, who are flooding this country with ready-made remedies, and cut and dry formulæ for every ache and symptom to which flesh is heir. This practice he designated as one that threatens either to exterminate the scientific pharmacist, or to convert him into a mere bottle-filling machine.

SIR JOHN LUBBOCK'S BILL.

We have received a letter from Mr. J. Hart, of Manchester, the publication of which, with that of others, is unavoidably postponed, in which he takes exception to the idea conveyed by Mr. Woolley in the remarks he made on the subject of Sir John Lubbock's Bill at the late meeting of Council. As a Manchester pharmacist, he desires to combat the notion that the pharmacists of that city are in favour of the Bill. That Mr. Woolley correctly represented the sense of the meeting he referred to is not questioned at all, but Mr. Hart points out that the meeting was constituted, if not entirely by what he terms the "aristocratic" section of the trade, at least to the extent of ninety-nine per cent of those who already close their establishments at seven or eight p.m. Amongst what he terms the "working class" on the contrary there is a very strong and bitter feeling against the Bill, as being one that would operate very disastrously upon the lower order of the trade. Hitherto the opponents of the Bill have taken no action, because, in the first place, they scarcely think it possible such a drastic measure could become law, and, secondly, because there would, in such case, be a possibility of obtaining exemption from its provisions under the clause intended for that purpose. Mr. Hart is of opinion that if the Council would decide to oppose the Bill, so far as regards its application to the drug trade, it would receive the thanks of thousands of hard-worked chemists, who are compelled to labour on until the "witching hour" is well-nigh come.

The *Standard* of Thursday has a leading article upon this subject, in which objections are raised to the Bill from a more general point of view. While giving full credit to the benevolent motives which have led Sir John Lubbock to introduce the Bill, admitting, also, that there is a large number of shopkeepers who would be glad to close earlier than they do, and that there are many young persons engaged in shops who feel the long hours of work to be a heavy strain upon their physical strength, it is held that the inconvenience occasioned by early closing would be a still greater evil to a disproportionately larger class. It is also urged that the principle of the Bill is thoroughly bad, as involving an interference with individual liberty of action. If this principle of State interference with the management of a man's private affairs is to be admitted, and the State is to decide when a man may sell a pound of candles, or when a customer may buy them, there will be no limit to State intervention of this kind. The application of such a principle might before long be extended to the regulation of the price of commodities, or, to take an illustration from pharmacy, we might have the German system of a fixed tariff for each ingredient of a prescription. Apart from criminals and public offences, compulsory legislation is generally distasteful, but when it comes to prescribing to a small coal dealer or tallow chandler in Whitechapel at what hour he shall leave off business the *Standard* considers that the rare distinction of being at once ridiculous and odious would be achieved. On the whole, therefore, the *Standard* thinks that it would be best to drop the Bill altogether, and to leave the arrangement of reduced hours of labour to be settled between employers and employed according to circumstances.

The second reading of the Pharmacy Acts Amendment Bill in the House of Lords is fixed for Friday, the 11th inst.

* * *

On Wednesday evening next an Evening Meeting of the Pharmaceutical Society will be held at 36, York Place, Edinburgh, when the following papers will be read:—"Note on a Theory of Emulsification;" "Practical Remarks on Pearl Coating of Pills," by Mr. W. Gilmour; "Note on Lime Water," by Mr. J. S. Fraser; "Note on the Corrosion of a Zinc Refrigerator by Ammonium Chloride and Potassium Nitrate," by Mr. J. H. Fisher; "Note on Syrup of Tolu," by Mr. F. Stephenson; and "Presence of Manganese in Chlorinated Lime," by Mr. A. Shand. The chair will be taken at half-past eight o'clock precisely.

* * *

The new Pharmaceutical Register for the colony of Victoria, a copy of which has just been received, contains 684 names, showing an increase of 53 names since our last note on the subject two years ago. In addition it contains a list of five persons, widows and executrices of pharmaceutical chemists, to whom permission has been granted by the Pharmacy Board to carry on business under the management of a registered pharmaceutical chemist for a period of twelve months; and another list of thirty-five persons to whom certificates have been issued authorizing them to sell poisons at places four miles distant from the shop of a pharmaceutical chemist.

* * *

At the next meeting of the Chemical Society on March 17 there will be a ballot for the election of Fellows, and the following papers will be read:—"The Action of Heat on Nitrogen Peroxide," by Dr. A. Richardson; "The Formation of Naphthalenesulphonic Acids by means of Sulphuric Anhydride," by Dr. Armstrong and W. P. Wynne, B.Sc.

* * *

The next meeting of the School of Pharmacy Students' Association will be held on Thursday, March 17, when the Hon. Secretary, Mr. F. W. Short, will offer some remarks on the commoner difficulties met with by beginners in chemistry, and Mr. F. J. Yeatman will make a Report on Physics.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

Wednesday, March 9, 1887.

MR. MICHAEL CARTEIGHE (PRESIDENT) IN THE CHAIR.

An Evening Meeting of the Pharmaceutical Society was held at 17, Bloomsbury Square, on Wednesday last. The chair was taken at eight o'clock by the President, when the first paper read was a—

NOTE ON LINIMENTUM TEREBINTHINÆ AND SAPO MOLLIS.

BY EMERITUS-PROFESSOR REDWOOD.

The paper is printed at p. 741, and gave rise to the following discussion :—

Mr. MARTINDALE said sapo mollis, as he had met with it, was greenish and nearly neutral. The first sample of the official turpentine liniment that had been made upon his premises was a fairly satisfactory preparation. But the second was not so ; it made a bad emulsion, separating after keeping, and a clear layer settled at the bottom of the bottle. Another sample, made with another sample of soap, was almost as limpid as possibly could be, although he had used his best powers to make it a good emulsion. The only deviation from the Pharmacopœia directions was that he used warm water to make the soap readily soluble. In the *Pharmaceutical Journal* a suggestion had been made for a modification of the Pharmacopœia formula by substituting rectified spirit for an equal weight of water. The preparation so made was translucent and homogeneous.

Mr. TRAFF pointed out that under the heading "Sapo Mollis," it was stated in the Pharmacopœia that it was present in turpentine liniment in the proportion of 2 ounces of soap in 17½ ounces. Referring to the Pharmacopœia quantities for that preparation, he found the proportion was 2 ounces to nearer 19½ ounces. That seemed to afford some justification to those pharmacists who had imagined that there was some error, since it seemed to allow for the two ounces of water, which, as some suggested, should be added. This made a good emulsion. Moreover, in the formula for the liniment, it was directed to rub the "fluids" together, but the term fluid was not applicable to the mixture of the soap with only 2 ounces of water.

Mr. BURNETT said that the reader of a paper at a recent meeting of the Chemists' Assistants' Association mentioned that many of the green soaps turned yellow upon being kept for a short time. He had himself noticed the same fact in the commercial preparations. The ordinary sapo mollis, B.P., became yellow upon being kept for six months. The reader of the paper stated that this change was a sign of bad manufacture. As to turpentine liniment he had some of the preparation made for him about twelve months ago in the form of a jelly of about the consistency of a table jelly. This preparation was still in the same state as when it was put into the bottle.

Mr. MACEWAN stated that the essayist referred to attributed the change of colour to oxidation, and not to bad manufacture.

Mr. SEWARD said that previously to eight or nine years ago, the best soft soaps were of a somewhat amber colour. The character of green soaps, however, was that they were exceedingly pure, and many persons had come to look upon a green soap as synonymous with a pure soap. As there was now a certain amount of confidence in green soaps, he thought that it would be a pity to disturb it. Professor Redwood's paper had stated that green soaps were very pure. Many of the yellow soaps were otherwise.

Mr. MACDERMOTT said that very few persons made turpentine liniment strictly according to the Pharmacopœia, for unless heat was used the preparation could not be made fluid. He found that in mixing the soap with cold water and then adding turpentine gradually he obtained a beautiful opalescent paste. With regard to the keeping of the liniment he had found that if it were put in a covered pot it became quite liquid at the top after twenty-four hours, but this would again mix with the other portion and form a perfect paste. If it was kept air-tight it would remain as a paste for some weeks, if not months. He had also noticed that as successive quantities of turpentine were added the emulsion seemed to get thicker. It was rather a tedious process which was given in the present Pharmacopœia, for the turpentine required a great deal of rubbing in. He should like to know whether in future a description of what the liniment ought to be like would be appended to the formula in the B.P., so that it might be known whether the preparation should be sent out as a liquid or as a paste. The practice of different houses varied in this respect.

Professor ATTFIELD said that the criticism as to the mixing of the "fluids," which had just been spoken of, was somewhat old. The word was omitted in the last reprint of the Pharmacopœia at the suggestion of Professor Redwood himself, and the omission was recorded in the list of corrections.

Mr. BLAND said that in the old Pharmacopœia the only official hard soap was an olive oil soap. In the present Pharmacopœia there were two hard soaps, an olive oil soap and an animal soap. It was well known that the manufacture of animal soap might vary considerably, according to the different manufacturers. One important point in connection with this subject was the state of hydration in which the different soaps came into the hands of pharmacists. In the hard olive oil soap it was impossible for the manufacturer to get in more than a comparatively small percentage of water, but it was very different with the hard soap which was made from animal fat, especially if cocoanut oil fat were present. Into such a soap water might be introduced in enormous quantities. The difference in weight between a piece of such soap when fresh and when dry was astonishing. The soaps of commerce deserved more attention in this respect than they had received. The fact which he had pointed out might account for some of the difficulties which had been noticed in making turpentine liniment.

Dr. REDWOOD, in reply, said that of course they all knew that Mr. Martindale was an expert pharmacist, but notwithstanding that he (Dr. Redwood) ventured to doubt whether Mr. Martindale had prepared the sample which he had exhibited in the way in which a pharmacist would make an emulsion. He (Dr. Redwood) could certainly produce such an emulsion as that by using a narrow pestle, such as he had on the table, but he repudiated that mode of operating. When a small-headed pestle of that sort was used the soap was broken up into little flakes which would swim about in the water, but would not dissolve previous to the addition of the turpentine, and no satisfactory result could be obtained. He had two or three times obtained such a result, but he had put it aside. He should be ashamed to show it. He would venture to appeal to Mr. Martindale to bring his soap to his (Dr. Redwood's) laboratory and let him manipulate with a broad-headed pestle, carefully selected, one which fitted the contour of the bottom of the mortar. When such a pestle was used the soap became triturated. With the small-headed pestle he could break the soap up, but he could not triturate it, and trituration, especially when the turpentine was added, as well as before, was necessary for a proper result. He had never met a case in which trituration, properly conducted, had failed. As he had stated, the thickness of the emulsion would depend in a great measure upon the more or less alkaline condition of the soap. Mr. Martindale had stated that his soap was nearly neutral, but he had not

indicated how he determined that fact. He had never met with a sample of commercial soft soap which did not leave a residue upon being dissolved in rectified spirit. Once or twice he had been deceived upon dissolving the soap in rectified spirit and pouring off the clear part and adding the phenol-phthalein to it. In that way he at once got a deep reddening; but he had never met with any sample in commerce which, if carefully filtered, after being dissolved gave any indication with the phenol-phthalein test. It was neutral in regard to caustic alkali, but it always contained K_2CO_3 in variable quantities from 1·4 per cent. to nearly 3 per cent., and this made a difference in the results. If the soap was alkaline it would hang about, and it would require an open-mouthed bottle. When it had been enclosed it would become more liquid in the course of a few days, although it might be closely corked. In one of the bottles which he had before him was contained a product which he had made by using soap prepared by himself, and which had rather a large excess of caustic alkali left in it. It had been made a week, and was still quite firm. But when he came to operate with exactly the same soap, after he had converted the alkali into a carbonate and taken away the carbonate by dissolving in spirit, it formed an emulsion which was in a more or less liquid condition. He would engage to say that no sample which was carefully manipulated with the precautions he had indicated would fail to give such results as he had referred to. One of the speakers had remarked that he (Dr. Redwood) had found the green soaps to be pure. That statement did not correctly convey what he intended to say. He did not consider that any of the green soaps were pure. They were either made with oil other than olive oil, or, as he thought more likely, contained some added colouring matter. In all probability they had been coloured to make them correspond with the character which was indicated in the Pharmacopœia. He intended to make inquiries with a view of finding out, with reference to soft soaps prior to 1867, when they were required to be yellowish-white and not yellowish-green. One of the bottles contained a sample of soap of his own manufacture, made with pure olive oil, and rendered neutral by converting the excess of alkali first into carbonate, and then removing it by dissolving in spirit. This he should look upon as showing the proper character of olive oil soft soap. He trusted that in the future that character would be introduced into the Pharmacopœia.

The PRESIDENT said that it was delightful to find the veteran Professor coming out as he had done in answer to some adverse criticism of certain of his special preparations in the Pharmacopœia. He had shown how well he was able to defend every pharmaceutical process in which he had had a hand.

The PRESIDENT then said there were two papers to be read upon the subject of Strophanthus, the discussion on which could be taken together. The first was—

A CONTRIBUTION TO THE PHARMACOGNOSY OF STROPHANTHUS.

BY WILLIAM ELBORNE.

This will be found at p. 743. The next paper was entitled—

SOME NOTES ON STROPHANTHUS.

BY H. HELBING.

The paper will be found on p. 747.

Previous to the discussion of these papers, Professor DUNSTAN, at the request of the PRESIDENT, gave a brief *résumé* of "Some Notes on the Pharmacology of Strophanthus," by H. D. Rolleston, B.A., which will be published in the next number of this Journal.

Mr. MARTINDALE said that it was interesting to learn that the ethereal extract obtained in the preliminary treatment of the seeds for the removal of oil, by the process recommended by Professor Fraser, was active to some extent. He was inclined to think that the removal of the oil might be useful in rendering the strophanthin which remained in the seed still more accessible to the rectified spirit, though Mr. Elborne had shown that proof spirit took out more of the glucoside than rectified spirit did. The percolation of the seeds, either by ether or spirit, was a very tedious operation. He had had some tincture in manufacture for nearly a fortnight, and in both the alcoholic and the ethereal percolation the albuminous matter in the seeds seemed to check the process. He had dried the bruised seeds, and endeavoured to get the ether to pass through them with fair rapidity. He thought that the treatment with ether might be serviceable in allowing the alcohol to make a more perfect exhaustion than would be possible if the oil was still present. He believed that one in twenty did not exhaust the seeds. The marc remained intensely bitter, even after the percolation had been continued for a long time.

Mr. CHRISTY said that he had brought some specimens to show what an immense number of varieties of strophanthus there were. In speaking about the continent of Africa one was apt to forget the enormous extent of that country. One of the specimens belonged to a variety which came from the south-east of Africa. It was sent over at the time of the two shipments of the seed which had been collected there. Professor Oliver and Professor Baker, of Kew, both said that it was a different variety of *Strophanthus hispidus* from that which was got from the African Lakes Mission, and very different from that which Mr. Buchanan sent from farther up the river. Another of the specimens was one from the African Lakes Mission. Another was a specimen of whitish strophanthus, which they had heard of that evening, which was labelled as false strophanthus. This variety had been sent over to Europe for several years past from the west coast. It contained very little bitter principle. The supply of seeds recently received represented no doubt several varieties. Some of the pods were very short, and had only five or six seed cells in them.

Mr. LASCELLES-SCOTT, who was very indistinctly heard, exhibited some specimens of different species of strophanthus. He said that in experimenting with two of these physiologically he had found that the seeds of what he designated a rufous variety were more powerful than the others in the proportion of $1\frac{3}{4}$ to 1. The remarks of the readers of the papers coincided with his own experiments. There was, however, one remark with which he did not agree, and that was that the oil present in the seeds seemed to have the property of rendering the strophanthin more soluble in ether and certain other menstrua than it would be if the oil were not there; certainly that did not seem to be the case with regard to petroleum ether, therefore if the oil were extracted carefully with petroleum ether, and then the strophanthin was taken out with spirit, a stronger tincture would be obtained than could be got by using ordinary ether first and spirit afterwards. The statement about the albumen had interested him greatly, because the albumen seemed to be the "rock a-head" which prevented a satisfactory preparation from being made with the seeds. He had found that if he neutralized or precipitated the albumen by means of mercurial salts, first of all, he could obtain a far more powerful tincture from the residue than he could obtain in the same time if the albumen were left present and not rendered insoluble. He did not think that a definite tincture could be hoped for by simply using a given proportion of the seeds, as the seeds varied in strength from time to time. He would suggest that, until a definite method of deciding the strength of the tincture could be arrived at, something based upon the active energy of the tincture might be adopted as a standard. For instance, if a definite quantity of the tincture were applied to a certain animal, its strength could be measured by ascertaining the reduction in the number of heart-beats per minute which it produced. The effect of the tincture upon the heart was a peculiar one. The preparation might be called a heart

regulator. It reduced the beats of a feverish heart, but quickened the pulsations of a very languid one.

Mr. ELBORNE said that in the communication from Mr. Rolleston, which had been laid before the meeting by Professor Dunstan, there were one or two points which were inconsistent with his own experience. Could Professor Dunstan say what variety of seed Mr. Rolleston had used. Mr. Rolleston stated that the ethereal extracts always contained a certain amount of the bitter principle with the fixed oil. In his (Mr. Elborne's) paper he had alluded to the necessity of having a thoroughly absolute ether; and this had to be specially prepared. In the last filtration everything depended upon the temperature of the room and the amount of moisture present. Upon the evaporation of the ether in a very moist atmosphere there was a very large amount of condensation, and ice would be found to fringe the filter; this quickly disappeared, and tended to saturate the paper; and then, of course, if any more ether were used it would cease to be anhydrous. The extraction of the seed with proof spirit had been spoken of as likely to yield a larger quantity of the active principle. This would perhaps more thoroughly exhaust the seed, but he was sure that it would not be advisable to lower the alcoholic strength, for the seed contained a large quantity of albumen which was peculiarly liable to undergo decomposition. Mr. Lascelles-Scott had recommended petroleum ether in place of ordinary ether for the previous extraction. But if that were used the colour of the extract would be green, because chlorophyll would be left which would be taken out in the subsequent extraction by spirit. He did not understand whether Mr. Lascelles-Scott associated the use of mercuric salt for the precipitation of the albumen with the preparation of the tincture.

Mr. LASCELLES-SCOTT: No, simply as an experiment.

Mr. ELBORNE: As to the physiological test which Mr. Lascelles-Scott suggested, he did not think it practicable.

Professor DUNSTAN said that he believed that the strophanthus used by Mr. Rolleston was *Strophanthus hispidus*. As to the ether, in every case absolute ether was used. Four different persons made the extract for Mr. Rolleston. He (Professor Dunstan) could vouch for one particular case in which the ether was perfectly free from alcohol and water. He believed that closed percolators were used. Up to the present every specimen of oil which Mr. Rolleston had examined contained strophanthin. It was desirable that the oil prepared by Mr. Elborne should be physiologically examined.

Mr. HOLMES said that the Society was much indebted to Mr. Christy for the loan of the excellent specimens of strophanthus which had been placed on the table; such complete specimens were rarely to be found in herbaria. He quite agreed with Mr. Christy that there are many species both in East and West Africa of which at present very little is known. The greenish-brown seeds now in commerce, and which alone are at present used for making the tincture, are obtained from a plant with hairy leaves which differ decidedly in shape from those of *S. hispidus*; the seeds also are different in colour and size, and in the character of the hairs, which in *S. hispidus* are dark brown and short. The strophanthus leaves on the table were presented to the Society's Herbarium some months ago by Mr. Lindsay, the Curator of the Edinburgh Botanical Garden. They had been grown from some of the seed used by Professor Fraser, apparently the greenish-brown kind. These leaves differed considerably from those of the type specimen of *S. Kombé* in the Kew Herbarium, so that it appeared they were derived from a hairy leaved species resembling *S. hispidus*, but not identical with it. Possibly the "white" seeds might be the produce of *S. Kombé*, Oliv., but there was no evidence to that effect. The pods containing them were shorter, more marked with white spots, and the seeds were easily distinguished by the fact that the hairs do not become shorter at the apex of the seed, so that the tapering outline of the apex is hidden by them. The seeds shown by Mr. Lascelles-Scott from Delagoa Bay belonged to another section of the genus, in which the leaves were smooth and more coriaceous. It was important to note that the experiments that had been made by the two gentlemen who read the papers that evening had been made, not with the brown seeds of *S. hispidus*, nor with the white seed of *S. Kombé*, but with the greenish-brown. one which passes in commerce under the name of *S. Kombé*, The Society was also indebted to Messrs. Burroughs and Wellcome for the loan of an arrow poisoned with strophanthus, and of an original plait of strophanthus pods, showing the way they were packed for exportation. On the table there were some interesting specimens forwarded from Hong Kong by Mr. W. E. Crow, a former student and first prize man (1883) of the Society. One of these was the root and stem of *Gelsemium elegans*, which was used for criminal poisoning in China, and in which Mr. Crow had discovered an alkaloid resembling gelsemine. On a former occasion Mr. Crow had sent flowers and fruit of the plant for the Herbarium, so that the plant was now fully represented in the Museum of the Society. Another of the interesting specimens sent by Mr. Crow, and probably seen for the first time in this country, were the leaves, stem and root of *Strychnos Ignatii*. Some abnormally developed lemons had been sent by Mr. H. Ballchin. The peculiarity consisted in the carpels being partially separated above, giving a fingered appearance to the lemon. This was attributed to the bite of an insect, in an early stage of growth of the fruit, preventing the union of the carpels, which were, he believed, in the young state nearly free. The Curator also called attention to a specimen of recrystallized proteacin and phloroglucin, obtained from the kino of *Pterocarpus marsupium*. These had been presented to the Museum by Dr. Schuchardt of Goerlitz. The proteacin was used as a remedy for malarious fevers by Dr. J. W. Beek of Rondebosch, Cape Colony. The specimen of anhydrous lanolin presented by Messrs. Burroughs and Wellcome was of a brown colour, but when mixed with water assumed the pale yellowish colour of ordinary lanoline. It was said to be capable of absorbing 200 per cent. of water.

Mr. CHRISTY said that having resided in China he could state one curious fact about the lemons and citrons. Those which were divided were called in China the Buddha's claw. They had been lately grown in Algeria, but they could not produce them in Algeria until the priest sent for the insect. It was said that the curious points were caused by the insect piercing the fruit.

The meeting then adjourned.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held at the Society's rooms, No. 11 Harcourt Street, Dublin, on Wednesday, 2nd instant, at 3 p.m.

The President, Mr. William N. Allen, in the chair.

The other members of the Council present were the Vice-President, Mr. Draper; Mr. Brunker, Professor Tichborne, Dr. Collins, Dr. Montgomery, Mr. Wells, Mr. Doran, Mr. Beggs, Mr. Hayes, Mr. Grindley and Mr. Simpson.

The Registrar, Mr. Arthur T. Ferrall, read the minutes of the last meeting, which were confirmed.

Mr. Brunker said his attention had been called to the fact, that one of the three days appointed for the examination for the licence would fall on Good Friday. It was desirable to alter that.

After some discussion it was ordered that the days of examination should be April 5, 6, and 7.

A letter was read from Mr. Charles Threadgale, St.

Hubert's Lodge, Great Harwood, Lancashire, stating that he was twenty-seven years of age and a Canadian by birth. Eleven years ago he was apprenticed to an apothecary in London [England] and served five years. In April, 1882, he presented himself at the Preliminary examination of the Apothecaries' Hall, and passed in all the subjects except mathematics. Owing to the death of his father in August, 1882, he was obliged to return fo Canada. Last year he came back to England. Under these circumstances he asked to be allowed to present himself at the Licence examination, after having passed a medical preliminary examination, and attended a three months' course in Practical Chemistry, Botany, Materia Medica and Pharmacy at a recognized school, without waiting until two years should have elapsed from the time of passing the Preliminary examination.

The Vice-President: What does he mean by the statement that he "passed except in mathematics?"

Dr. Collins said it might mean that he passed the examination as the course stood when he went in; but that he had not passed in "mathematics," which had since been added to it.

On the motion of Mr. Hayes, seconded by Professor Tichborne, it was ordered that Mr. Threadgale should be asked to state what Preliminary examination he had passed, and where, and to produce the certificate of his having passed the same; otherwise that he should have to comply with the regulations of the Society.

A letter from Mr. Patrick J. Lyons, 59, Arthur Road, Belfast, stating that he had been unable to attend the last Licence examination beyond that for theoretical chemistry, and asking to be informed when he might again present himself, and whether a fee would be required.

Professor Tichborne said he had received a letter calling attention to a mistake about this gentleman in the report which appeared of the proceedings of the last meeting of the Council. It was inaccurately stated that he had passed.

On the motion of Mr. Brunker, seconded by Dr. Collins, it was ordered that Mr. Lyons should be permitted to appear at the next examination for the licence on paying a fee of 10*s.* 6*d.*

The Vice-President remarked that with a view to future action on this point it would be well to ascertain what was the practice of other bodies in the case of students attending part of an examination and then leaving.

Mr. Wells thought it would not be judicious to allow gentlemen to attend part of an examination, and then, if they did not do well, to stop away, and come up at the next examination.

The Vice-President: They could also take away the papers and use them for their guidance.

Mr. Brunker said that would not much matter, because after the examination the papers could be bought for a shilling.

The President said the members of the Council had in their hands copies of a letter which he had received from the Editor of the *Chemist and Druggist.* He had taken the course of sending copies to them because he thought the letter should have been addressed to the Council and not to him. He had grave doubts as to the propriety of the course which Mr. Wootton had adopted of taking a consensus of opinion of the members of the Society with respect to the question raised by his letter. That document concluded with a statement that the wishes of the majority of the members of the Society had been unmistakably revealed to be in the writer's favour. He (President) thought the letter rather tended to show the opposite. It showed that of seventy-one members only twenty-four were favourable to Mr. Wootton. The remaining forty-seven were either neutral, or replied to the contrary, or said they did not wish to give an opinion, or did not reply at all. According to his own way of arguing, the forty-seven should be deemed to be against him. There were two gentlemen who approved of his journal, but said that they never read the *Pharmaceutical Journal* at all; so that their opinions were not worth much.

Dr. Montgomery: I do not think there is any use in wasting time on the subject. I think the members of the Society have given their opinion in favour of the *Pharmaceutical Journal.*

Dr. Doran: If members want the *Chemist and Druggist*, they can subscribe for it.

Mr. Brunker said there was no doubt that the *Chemist and Druggist* was worked with a great deal of energy and enterprise. But in so far as the letter conveyed the opinions of anonymous writers, it was unworthy of being dealt with by the Council. Some of the persons who had replied to Mr. Wootton might be persons whose opinions were not worth much; while others might be persons whose opinions the Council would value very highly. So that there was really no basis on which to deal with the letter. But if the Council were to turn their backs on the English Society which had treated them with such liberality, they would be doing a very unworthy act. They got the *Pharmaceutical Journal* for over fifty members of the Society for about £5 a year; and the total cost in connection with it was not more than £12 or £13 a year. Anyone who wanted the *Chemist and Druggist* could pay 10*s.* for it, and it was very good value for that money.

Dr. Doran: I doubt very much if many of the objections which have been made to the *Pharmaceutical Journal* came from members of the Society at all.

The Vice-President said it was not necessary to laud the *Pharmaceutical Journal* at the expense of the *Chemist and Druggist*, which was a clever and well-conducted trade journal as far as it went, although perhaps it had not very high scientific pretensions. He did not, however, approve of the course which it had taken of carrying out a sort of plebiscite for the purpose of introducing the *Chemist and Druggist* into the place occupied by a rival journal.

Mr. Brunker: This letter says—"We think your Society ought to have the means of issuing its own announcements and reports sufficiently." That we have at present.

President: We may allow the letter to be marked "read." The receipt of it has already been formally acknowledged.

Mr. Hayes moved the following resolution:—

> "That this subject having been frequently discussed by the Council, and decided in favour of the *Pharmaceutical Journal* as the official organ of the Society, the Council sees no reason to alter its decision."

Dr. Montgomery seconded the above, which was passed unanimously.

Donations were received from the American Pharmaceutical Association of their 'Proceedings for 1886;' from the British Pharmaceutical Conference of the 'Year-Book for 1886;' and from the Pharmaceutical Society of Great Britain of their 'Calendar for 1887.'

A report of the Preliminary Examinations Commitee submitted a letter from Dr. Tweedy, the Society's Examiner, stating that in the main his conclusions as to the Preliminary examinations coincided with those expressed in the President's letter of October 6 to Sir William Kaye, but that in his opinion that examination would be rendered more efficient in its character if the following proposals were brought into operation:—(1) That 50 per cent. in English and arithmetic and 40 per cent. on the entire course be the minimum on which candidates be allowed to pass the Preliminary examination. (2) That English grammar form a definite portion of the examination. (3) That a knowledge of structural botany only be required of candidates. (4) That the examination in chemistry being on this occasion of an entirely theoretical character the first seventeen chapters of Roscoe's 'Elementary Chemistry' be substituted for the

manual at present in use, which, although a work of the highest excellence, is obviously intended for the use of students working in a laboratory. (5) That means be adopted to ensure the better isolation of candidates (such as the providing of separate desks or tables). That each candidate be supplied with proper writing materials, and that to save time all such preparations for the examination be completed previous to the arrival of the candidates, so as to allow the examination to commence punctually at the appointed hour.

Mr. Ferrall: I do not think that Dr. Tweedy had any cause for putting in that last recommendation.

The President said the Committee recommended that all Dr. Tweedy's proposals should be adopted except No. 4, relating to the 'Chemistry Manual.'

The Vice-President said Roscoe's 'Elementary Chemistry' was a book of the highest possible excellence, but, notwithstanding its title, it was only suited for advanced students, and would be useless to boys who had just left school. All that candidates for the Preliminary examination wanted was the most elementary knowledge of chemistry. Unless they decided upon leaving it open to students to get their information from whatever book they liked, he did not see why Roscoe's 'Primer' should not be reverted to.

Mr. Brunker thought that in chemistry, for the purpose of the examination in question, the amount of chemical knowledge that was required should be defined.

The Vice-President said the Preliminary Examination Committee should frame a syllabus for the Preliminary examination. He moved that that Committee be continued with a view to their defining the limits of the Preliminary examination in chemistry.

Mr. Brunker seconded the motion, which was agreed to.

A report of the Examination Improvement Committee having reference to the refitting of the examination room was adopted.

The Council then adjourned.

The Late Examinations.

The following is the official announcement of the results of the January examinations:—Passed Preliminary candidates: Henry L. Wilson, Monaghan; Edward Whelan, Limerick; James T. Watterson, Longford; Maurice O'Sullivan, Youghal; Thomas Adam Moody, Banbridge; Thomas W. McMurray, Clonmel.

Passed candidates for the Licence: Joseph Thomas Ponsonby Brabazon, Belfast; George Ambrose Henry, Belfast; Thomas White, Dublin; Frederick William Hatton, Dublin; William Smith Duggan, Rathmines; John Patrick Thomas Timmon, Navan.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The seventh meeting of the ninth session was held in the Pharmaceutical Society's House, 36, York Place, on the evening of Wednesday, February 9th, at 9.15. Mr. William Duncan, President, in the chair.

The minutes of last meeting having been read and approved, the evening was devoted to a series of notes and queries arranged by Mr. J. Rutherford Hill, who opened the proceedings by reading a note on—

A Solution of Hyoscyamine.

BY J. RUTHERFORD HILL.

The following note deals with a circumstance recently brought under my notice by Mr. Robbie. He had frequent occasion to dispense the following prescription.

℞. Hyoscyamin. amorph.	grs. ii.
Aquæ	℥ xx.

The hyoscyamine used was Merck's amorphous alkaloid. It is insoluble in water, and to overcome this difficulty it had been first dissolved in rectified spirit and then added to the water. The result was a somewhat muddy mixture, which on standing deposited a flocculent precipitate, and in bottles returned to be refilled it was found that the sides were coated with a brown deposit. By filtering the mixture a more elegant result was obtained. The mixture did not deposit so much on standing, but it very properly occurred to Mr. Robbie that the deposit might consist of active principle, and that the greater elegance was attained at the expense of therapeutic value.

I separated a quantity of the precipitate from the mixture, washed it with water, and found it to be alkaline to test paper. It was freely soluble in dilute H_2SO_4 and gave an abundant precipitate with Thresh's potassio-bismuthic iodide test for alkaloids.

Undoubtedly Mr. Robbie was correct in thinking that it was an error to filter such a mixture. The prescription in fact is incomplete. To secure a good stable solution, it is only necessary to add a sufficiency of dilute sulphuric acid to form sulphate of hyoscyamine which is freely soluble in water. It does not secure the object in view simply to attach a "shake the bottle" label, as the amorphous alkaloid adheres to the sides of the bottle and cannot be detached by shaking.

It may be interesting to note that the amorphous alkaloid used in this case has a strong disagreeable smell. This, I think, is almost entirely due to the solvent used in the process of extraction. From the odour of the solution I should say it had been extracted either by benzol or benzolated amylic alcohol. I have separated the alkaloid from a portion of the washed precipitate dissolved in H_2SO_4, by treating with excess of Na_2CO_3 and shaking out with chloroform, and you observe that it has no odour,

You will also notice that the alkaloidal solution is distinctly fluorescent. I think it is very likely that this fluorescence is due to the presence in the amorphous alkaloid of a fluorescent substance, similar to that found in belladonna by Kunz (*Pharm. Journ.*, [3], xvi, p. 365) and in *Scopolia japonica* by Professor Eykman. (*Pharm. Journ.*, [3], xv., p. 81). This substance was called chrysatropic acid by Kunz, and scopoletin by Eykman. Kunz's discovery has been confirmed by Paschkis (*Pharm. Journ.*, [3], xvi., 838) and this substance is very probably present in other solanaceous plants. It is a glucoside having the formula $C_{12}H_{10}O_5$, and seems to closely resemble æsculin.

The Chairman said he had observed in the 'Year-Book of Pharmacy' for 1886, that Paschkis gave the formula $C_{10}H_8O_4$ to this fluorescent substance. This brought it much nearer tropic acid, which was known to be a decomposition product of atropine and similar alkaloids. He, therefore, thought it probable that this substance did not occur in the plant, but was produced during the process of extraction.

The Chairman then read the following—

Note on the Reaction Between $AgNO_3$ and Sp. Ætheris Nitrosi.

BY WILLIAM DUNCAN.

The following is a prescription at the present time very frequently met with in Edinburgh:—

Nitrate of silver	gr. 20
Spirits of nitre	℥j.

and is used as a paint for ringworm and eczema; a modification of the same is found in the London Throat Hospital Pharmacopœia.

Two years ago when I was first called to dispense it, it struck me that it was an incompatible mixture, but the whole affair passed from my memory until a fortnight ago, when it was being made up at the dispensary. A double quantity was made and the half was set aside to see what would take place. The silver nitrate is only

slowly soluble in the menstruum, and on adding it in fine powder a white milky-like mixture is the result. In the course of an hour a black precipitate falls, leaving the supernatant liquor perfectly clear. In twenty-four the bottle is partially covered with metallic silver.

Thinking the reduction of the salt was due to the aldehyde which is always present in samples of sp. ætheris nitrosi, I first proved the presence of that compound by the liquor potassæ test, and again make an ounce of the lotion. The mixture was allowed to stand for a week, when I presumed the reduction of the silver would be complete. One drachm of the clear solution was taken and evaporated, and the residue (silver nitrate) weighed 1·8 grain. A second drachm was taken, and the whole of the silver in solution thrown out by excess of liquor potassæ filtered, and the filtrate afterwards boiled; it gave no indication of aldehyde, proving that it had been all oxidized into acetic acid. The explanation, therefore, which I have to offer regarding the decomposition is that any aldehyde present reduces the silver nitrate to the oxide, and even to the metallic state: the excess of the salt going into solution as silver nitrate. Of course it is possible that the other constituents of this complex compound, sp. ætheris nitrosi, may have a reducing action as well, but I have not thought it necessary to go further into the question.

Mr. Mackenzie said he had found the white precipitate, at first formed, soluble in water. Water was present in the Throat Hospital formula, and he thought a mistake had been made in omitting it in the cases brought forward by the President.

Mr. W. S. Turnbull then read the following :—

Note on Some Preparations of Iodoform.

BY W. S. TURNBULL.

Iodoform has lately come into frequent use with medical practitioners, so that it may be said to have gained a place amongst the more important medicaments of the time.

It is to be regretted, I think, that in our Pharmacopœia the solubility of the drug is not more clearly defined, and that the question of solubility in many cases has received so little attention from the compilers of our National Compendium.

There are two pharmacopœial preparations of iodoform, the suppository and the ointment; these seem to be faultless if carefully prepared.

Perhaps in nothing does the dispenser encounter greater difficulties than in the making of suppositories. The best basis for most suppositories, no doubt, is oil of theobroma; though many seem to have a special liking for soap as a basis, but recent observation has convinced me that soap is unsuitable as a basis for iodoform suppositories, especially if they require to be kept for any length of time.

A number of suppositories containing iodoform, opium and soap were prepared according to a prescription about six months ago, at the same time a number were prepared according to the Pharmacopœia. On examining them, lately, I found that in the case of those made with the soap basis the iodoform had volatilized to such an extent that the layer of cotton-wool in the box had become completely saturated with crystals of iodoform, while those made with oil of theobroma as a basis remained perfectly in the same state as when first made. This seems sufficient proof that in the case of iodoform suppositories soap is objectionable as a basis.

Although, as I have said, the pharmacopœial ointment of iodoform, if carefully prepared, seems to be without fault, still it is not unusual to have an ointment prepared with iodoform and vaseline. I made a small quantity of this ointment of pharmacopœial strength, and after exposing it for about twenty-four hours to the light it presented anything but a uniform appearance, the ointment on the surface becoming much darker than that below. I failed, however, to find free iodine, but Mr. Hill informs me free iodine can be detected in an ointment composed of iodoform and vaseline if exposed to the sun for some time. Perhaps my being unable to find iodine without the application of heat may be due to the want of sunshine, but the subject of the incompatibility of iodoform with the hydrocarbons is doubtless one worthy of further investigation.

Odin and Seymarie, while experimenting with iodoform in 1873, found, in making solutions in ether and other solvents, that if iodoform in the crystalline state be simply agitated in a white glass flask with ether, and so dissolved, it will keep without change for a considerable time; but if powdered iodoform be used the solution develops a dark brown colour, which development of colour is prevented by using a red glass flask, and they attribute the coloration to the liberation of free iodine. Light in this case appears to be instrumental in bringing about the change.

Mr. Helbing has observed that an ethereal solution of iodoform, when exposed to light, acquires a brown tint, gradually becoming darker, due to the liberation of iodine.

In the *Pharmaceutical Journal*, vol. xvi., and *Medical Gazette*, May 29, p. 259, he says the action of sunlight may be retarded by the addition of a small quantity of alcohol, but to prevent the alteration in ethereal solutions it is necessary to preserve them in black or brown bottles. The dissociating action of sunlight is also exercised upon the superficial layers of ointment containing iodoform if exposed. The change of colour varies with the excipient, being blackish brown with vaseline, violet red with paraffin, and red with benzoated lard. You will also notice on the table two solutions: one of iodoform in petroleum ether giving a purplish colour; the other iodoform in benzol giving a red colour. In both of these I have found free iodine. Very probably iodoform may come into use as a purity test for petroleum products of the vaseline type; at least I think some member of this Association might with advantage take up the subject. I have also had prepared several iodoform bougies with the glycerine and gelatine basis, and also some according to Professor Chiene's formula with oil of theobroma. We must bear in mind that iodoform is almost insoluble in glycerine (1 per cent.), therefore neither will it be held in a state of solution, nor will its absorption be facilitated, for on high medical authority it is stated that fat facilitates the absorption of iodoform, therefore it is reasonable to suppose that iodoform from suppositories and bougies when prepared with oil of theobroma will be more readily absorbed than when made with a basis which not only does not aid, but must have a tendency to retard absorption.

In regard to iodoform pills, which are coming much into use in hospital practice, doctors as a rule do not mention any excipient for their preparation; it is therefore left to the dispenser to use the one most suitable. Glycerine of tragacanth is recommended by Martindale, and either this, or ext. gentianæ, may be used with advantage. The latter I prefer, and the small quantity required does away with the objection so often raised against the use of gentian, viz., that of its being a medicinal agent of itself, for the maximum dose of iodoform is considerably below the minimum pharmacopœial dose of ext. gentian. If at any time there exists a necessity for coating pills it certainly does exist in the case of iodoform pills.

Attempts have been made to deodorize iodoform when used as a dusting powder for sores, and the most efficient substance in disguising the odour is coumarin, as will be seen from the sample I exhibit.

The Chairman stated that coumarin was open to the objection that it very soon volatilized and left the iodoform. He had found ground coffee a most effectual mask for the odour of iodoform.

Mr. A. R. Robbie then read the following :—

Note on Confection of Sulphur.

BY A. R. ROBBIE.

At an evening meeting of the North British Branch on February 8, 1882, Mr. Boa read a paper on "Confection of Sulphur," making a suggestion which greatly improved that preparation, and showed that a happy idea and a very simple expedient may produce a result of considerable practical value.

The improvement was deservedly adopted in the British Pharmacopœia of 1885. Even this improved confection, however, is open to the objection that when it is kept for some time, especially under circumstances favourable to evaporation, it becomes dry and hard.

Having recently had my attention specially drawn to the matter I made a few experiments to ascertain if any simple means could be adopted to obviate this defect. I found that this could be accomplished by the addition of a small proportion of glycerine.

The following formula gives a product which appears to leave nothing to be desired :—

Sulphur. sublimat.	℥iv.
P. G. tragacanth.	gr. xviii.
Tinct. aurantii	℥ss.
Ac. tart. potass.	℥i.
Glycerini	℥vi.
Syr. simpl.	℥ii. ℥vi.

Misce.

I have here a sample made by the above process, about three months old, which has been kept in a pot loosely covered with a piece of parchment paper laid on, but not tied down, and occasionally removed. You will see that it is still in perfect condition.

It has been said by a great writer that "There is nothing new under the sun," and I find on looking over the *Pharmaceutical Journal* that the addition of glycerine to confection of sulphur was suggested by Mr. Kermath on March 11, 1882. This had escaped my notice until after the note was written, and it seems also to have escaped the notice of the editors of the Pharmacopœia. My experiments may have value, however, in proving that the suggested modification stands a pretty severe test satisfactorily, and would have been a useful addition to the official formula.

After an interval of ten minutes to allow members to examine the specimens exhibited, a note was read entitled—

Note on Suspension of Terebene and Tolu in the Same Mixture.

BY JAMES BISSET.

The following note contains the results of a few experiments as to the best method of dispensing the following mixture :—

℞ Terebene		℥i.
Sp. chloroform.		℥ii.
Tinct. tolu		℥ii.
Syr. tolu.		℥vi.
Aq. menth. pip.	ad	℥vi.

The notable feature in the above mixture is the circumstance that the best manipulation to secure suspension of the terebene differs from the best manipulation to secure suspension of the tolu. Terebene is best suspended by rubbing it up in a mortar with a pretty thick mucilage of tragacanth ; but tolu cannot be satisfactorily dealt with in the same way, and is best emulsified by shaking up with diluted acacia mucilage in a bottle. I proceeded as follows :—Put 4 grains powdered tragacanth in a dry mortar, add sufficient sp. chloroformi to moisten thoroughly, and then water to make a fairly thick mucilage. To this add the terebene gradually, and, with diligent rubbing. Dilute 1 oz. mucilage of acacia with 2 ozs. peppermint water ; put it in a six-ounce bottle, shaking it so as to coat all the inner surface with a thin layer of mucilage ; add the tincture of tolu, and shake up immediately. Add the terebene emulsion ; shake well, and then add the other ingredients. This mixture, after standing for a time, separates into a creamy and a milky layer which mix easily by shaking.

A Note on a Precipitate of Glycyrrhizin in a Mixture.

BY GEORGE COULL.

The following prescription was handed to me with a query as to the nature and cause of the precipitate produced, and the correct method to be adopted in dispensing :—

℞ Sodii sulph.		℥i.
Quininæ sulph.		grs. xx.
Acid. sulp. dil.		℥ii.
Ext. glycyrrhizæ liq.		℥vi.
Aquam	ad	℥viii.

The first thing that strikes one is the excess of acid ordered, if the only object of its being there is to dissolve the quinine.

Proceeding to make up the mixture in all conceivable ways, I found that the precipitate was unavoidable. I first made up the prescription as written, with the result that a thick flaky precipitate was produced, which, when allowed to stand for a day, became so tenacious that it could hardly be diffused by shaking. I then made the mixture, omitting the acid, in which case the precipitate was very fine and easily diffused through the liquid. I again made the mixture with just sufficient acid to dissolve the quinine, and the result was very similar to the second. Lastly, I made the mixture, omitting both the acid and the quinine, and got only a slight precipitate, the colour of the supernatant liquid remaining dark. In the three former cases the liquid was of a light brown colour.

Now, taking the queries in their order, we arrive at the following conclusions. The precipitate is sweet to the taste, and as glycyrrhizin is the only sweet substance in the mixture, therefore, it is glycyrrhizin. This was further proved by its dissolving in an alkaline solution, with emission of a peculiar odour, as stated by Flückiger and Hanbury. The cause of the precipitate is everything in the mixture except the water.

Hager states that alkaloidal salts generally are incompatible with liquorice. The quinine sulphate, therefore, conspires to throw down this precipitate. Strong solutions of all the commoner salts also precipitate glycyrrhizin slightly ; therefore the Na_2SO_4 assists in the precipitation. The chief cause, however, is the acid, which at once throws down the dirty white flakes which refuse to break and diffuse. As to the correct method to be adopted in dispensing, there may be room for difference of opinion. The excess of acid appears to serve no useful purpose. Seeing that both the precipitate without the acid and the precipitate with a minimum of acid have pretty much the same appearance, if the dispenser wishes to make it up as faithfully and accurately as possible, I think he should take the latter plan, *i.e.*, use a minimum of acid. I have to thank our esteemed President for permitting me to conduct these experiments in his laboratory.

Mr. J. Rutherford Hill concluded with some remarks on strophanthus and a—

Note on Two Instances of Incompatibility.

BY J. RUTHERFORD HILL.

The first of these occurs in a gargle containing alum, chlorate of potassium and bicarbonate of potassium. The aluminic sulphate in the alum reacts with the potassium bicarbonate thus :—

$$Al_2 3\,SO_4 + 6\,KHCO_3 = 3\,K_2SO_4 + Al_2 6\,HO + 6\,CO_2.$$

In this way the astringent action of the alum is lost. It is therefore a case of both chemical and therapeutic

incompatibility. The only way out of the difficulty is to suggest the omission of the potassium bicarbonate.

The second occurs in the following mixture :—

℞ Quininæ sulphatis . . . . . grs. xxiv.
Acid. nitric. dil. . . . . q.s.
Potassii iodidi . . . . . ℈ii.
Aquam . . . . . ad ℥vi.

In this case the nitric acid liberates iodine from the potassium iodide as follows :—

$$4HNO_3 + 2KI = 2KNO_3 + 2H_2O + 2NO_2 + I_2.$$

The liberated iodine combines with the sulphate of quinine to form the insoluble iodosulphate of quinine or herapathite, which is gradually deposited as a greenish-brown sediment. The best thing to do in such a case is to substitute sulphuric for nitric acid.

On the motion of the Chairman a cordial vote of thanks was awarded to those who had contributed to the evening's proceedings. There was a microscopic exhibition of botanical and zoological sections. Some new remedies were also exhibited, including strophanthus seeds sent by Mr. MacEwan.

Mr. Bisset was unanimously elected Treasurer in room of Mr. James MacInroy.

The Chairman having intimated the date of next meeting, the meeting was closed.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the above Association was held at the rooms, Great Russell Street, on Wednesday, March 2, when a paper was read on "Sanitation and Sanitary Legislation," by Mr. W. G. Blackham, in which the subject was dealt with by the author under three heads: (1) Water; (2) Antiseptics and Disinfectants; (3) The Disposal of the Dead. In some preliminary remarks he pointed out that although sanitation has only recently begun to assume the dignity of a science, homage was paid in ancient times to the goddess Hygeia, and the public health was treated of in the writings of Hippocrates, the Plinys and Aristotle. Homer was acquainted with the disinfectant properties of burning sulphur, since in the Odyssey he describes it as being used after the massacre of the suitors of Penelope; Pliny the elder also refers to the antiputrefactive and parasiticide properties of creasote. Nevertheless, as recently as a half a century ago the state of sanitation in this country was deplorable in the extreme, but in 1848 an Act was passed, which was the forerunner of legislation that has produced most salutary results, the most important Act being the Public Health Act, 1875. Under the first heading, "Water," the author referred to the munificent provision of this necessity, made by the Romans, contrasting it favourably in respect to quantity with the present London supply. The quality of the water was also referred to and the evils resulting from defective methods of filtering and storing, as well as the part water may play as a carrier of contagion. The author then proceeded to speak of "Antiseptics and Disinfectants," pointing out the confusion which frequently obtains in the application of these terms. Criticizing a statement made by Dr. Elliston that a 1 in 15,000 solution of perchloride of mercury is fatal to organisms the author said that from some rough experiments of his own he had arrived at the conclusion that such a solution delays the appearance of putrefactive bacteria only a few hours, whilst a 1 in 1000 solution delays putrefaction only a few days. The author said that in discussing the merits of an antiseptic two great points for consideration had been insisted upon by Dr. Klein: "(1) the condition may be unfavourable to the growth of the organism in question, and (2) the condition may be fatal to the life and existence of it;" although the second proposition involves *à fortiori*, the first, the *à priori* reasoning would be fallacious. In other words, although a substance may be unfavourable to, and even inhibit the growth of organisms, it is not necessarily a germicide. Dr. Klein found that although sowings of various species of putrefactive micrococci, bacteria, and bacilli and pathogenic bacilli, refused to grow in phenylpropionic acid, phenylacetic acid, carbolic acid, and perchloride of mercury solutions, yet on a portion being transferred to a suitable nourishing medium they grew and multiplied as if nothing had been done to them; and, in the case of pathogenic organisms, on being introduced with a portion of the antiseptic into suitable animals the characteristic disease was invariably produced. These results were of the greatest importance, but not conclusive, for the question remained whether, a germicide being necessarily a disinfectant, it is absolutely necessary for a disinfectant to be a germicide. Carbolic acid, for instance, seemed to act to some extent as a disinfectant, although vaccine lymph submitted to its vapour for some time afterwards regained its activity. The conclusion arrived at was that the only true and perfect germicide at present known is heat, especially moist heat, and the author suggested a practical application of this knowledge in the direct treatment of excreta and sputa from patients suffering from contagious diseases. In the last part of the paper, treating of the disposal of the dead, the author gave his reasons for preferring cremation rather than the ordinary mode of burial.

In the discussion which followed Messrs. Bird, Burnett, Botham, Dymond, Ellwood, Stanton, Taylor, Tinley, Worsley, and the Chairman took part.

Obituary.

Notice has been received of the death of the following :—

On the 11th of February, Mr. Clement Pierson, Chemist and Druggist, Brunswick Place, Leeds. Aged 51 years. Mr. Pierson was an Associate of the Pharmaceutical Society.

On the 14th of February, Mr. David Davies, Chemist and Druggist, Coleford, Gloucestershire. Aged 33 years.

On the 16th of February, Mr. John Knowles, Chemist and Druggist, Seymour Street, Euston Square, N.W. Aged 54 years.

On the 21st of February, Mr. William Godfrey Spyer, Chemist and Druggist, Watlington, Oxon. Aged 83.

On the 25th February, Mr. Thomas Hogg, Pharmaceutical Chemist, Bideford. Aged 67 years. Mr. Hogg had been a Member of the Pharmaceutical Society since 1853.

On the 27th of February, Mr. Walter Jackson, Pharmaceutical Chemist, Foxberry Road, Brockley, S.E. Aged 24 years. Mr. Jackson was a Member of the Pharmaceutical Society.

ANSWERS TO CORRESPONDENTS.

L. A. White.—You will find communications on the subject in the numbers for March 13, 1886, p. 778; Dec. 18, 1886, p. 503; Jan. 29, p. 605, and other places. See also the present number.

A. Wright.—We did not see that there was any necessity for the announcement.

F. D. Heath.—The suggestion for the use of a larger quantity of water in preparing lin. terebinthinæ has already been made by Mr. Baxter, in a paper that appeared in the *Pharmaceutical Journal* for June 5, 1886, p. 1026. See, however, Professor Redwood's communication in the present number, p. 741.

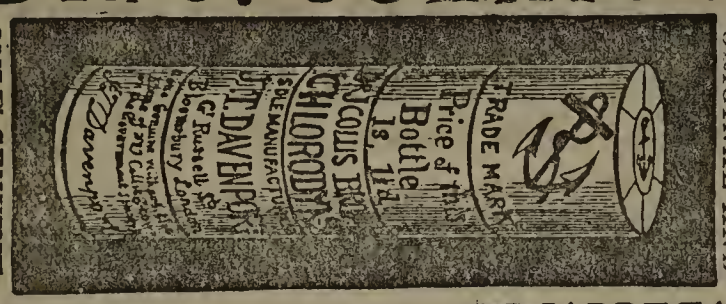
Tomlinson and Hayward.—We do not remember the publication of such a formula.

J. B. L. Mackay.—Your letter has been handed to the Hon. Secretary to the Fund.

COMMUNICATIONS, LETTERS, etc., have been received from Dr. F. P. Smith, Messrs. Modlen, Butler, Bartle, Hart, Hollely, Hill, Graham, Grierson, Experientia, Pro Bono Professionis, J. G.

THE ORIGINAL AND ONLY GENUINE.

DR. J. COLLIS BROWNE'S CHLORODYNE

ONLY GENUINE.  ORIGINAL AND

IS THE GREAT SPECIFIC FOR CHOLERA, DIARRHŒA, DYSENTERY.

COUGHS, COLDS, ASTHMA, BRONCHITIS.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Dr. J. C. BROWNE (late Army Medical Staff) DISCOVERED a REMEDY to denote which he coined the word CHLORODYNE. Dr. Browne is the SOLE INVENTOR, and, as the composition of Chlorodyne cannot possibly be discovered by Analysis (organic substances defying elimination), and since the formula has never been published, it is evident that any statement to the effect that a compound is identical with Dr. Browne's Chlorodyne *must be false.*

This Caution is necessary, as many persons deceive purchasers by false representations.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

DIARRHŒA, DYSENTERY. GENERAL BOARD of HEALTH, London, REPORT that it ACTS as a CHARM, one dose generally sufficient. DR. GIBBON, Army Medical Staff, Calcutta, states: "2 DOSES COMPLETELY CURED ME of DIARRHŒA."

From SYMES & Co., Pharmaceutical Chemists, Simla. *Jan.* 5, 1880.

To J. T. DAVENPORT, London.

DEAR SIR,—We congratulate you upon the widespread reputation this justly-esteemed medicine has earned for itself all over the East. As a remedy of general utility, we much question whether a better is imported, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances *ad infinitum* of the extraordinary efficacy of DR. COLLIS BROWNE'S CHLORODYNE in Diarrhœa and Dysentery, Spasms, Cramps, Neuralgia the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than Collis Browne's, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than Collis Browne's is a deliberate breach of faith on the part of the chemist to prescriber and patient alike.—We are, Sir, faithfully yours, SYMES & CO., *Members of the Pharm. Society of Great Britain, His Excellency the Viceroy's Chemists.*

DR. J. COLLIS BROWNE'S CHLORODYNE is the TRUE PALLIATIVE in NEURALGIA, GOUT, CANCER, TOOTHACHE, RHEUMATISM.

DR. J. COLLIS BROWNE'S CHLORODYNE is a liquid medicine which assuages PAIN of EVERY KIND, affords a calm, refreshing sleep WITHOUT HEADACHE, and INVIGORATES the nervous system when exhausted.

DR. J. COLLIS BROWNE'S CHLORODYNE rapidly cuts short all attacks of EPILEPSY, SPASMS, COLIC, PALPITATION, HYSTERIA.

IMPORTANT CAUTION.—The IMMENSE SALE of this REMEDY has given rise to many UNSCRUPULOUS IMITATIONS. Be careful to observe Trade Mark. Of all Chemists. 1s. 1½d., 2s. 9d., and 4s. 6d.

SOLE MANUFACTURER,
J. T. DAVENPORT, 33 Gt. Russell St., W.C.

THE ORIGINAL AND ONLY GENUINE.

IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

FURTHER IMPORTANT NOTICE.

The subjoined list of eminent Firms concur with Vice-Chancellor Sir W. Page Wood's statement in Court that Dr. Collis Browne was undoubtedly the Inventor of Chlorodyne; and that when Chlorodyne, or the Original Chlorodyne, is ordered, they invariably supply Dr. J. Collis Browne's:—

Apothecaries' Hall	London.	Frazer & Green	Glasgow.	Morson, T., & Son	London.
Allen, Hanbury & Co.	,,	Gale & Co.	London.	Newbery & Sons	,,
Baiss Brothers	,,	Giles & Son	Clifton.	Oldham, G., & Co.	Dublin.
Banks & Richards	Birmingham.	Goulding, Messrs.	Cork.	Parsons & Richardson	Leicester.
Barron, Harveys & Co.	London.	Grattan & Co.	Belfast.	Peake, Allen & Co.	Dublin.
Bell, John & Co.	,,	Grimwade, Ridley	London.	Raimes & Co.	Edinburgh.
Corbyn & Co.	,,	Grindley & Son	Chester.	Sang & Barker	,,
Cox & Gould	,,	Hearon, M'Culloch & Co.	London.	Sanger, J., & Sons	London.
Curling & Co.	,,	Hodgkinson, Tonge & Stead	,,	Sim, James, & Co.	Aberdeen.
Davy, M'Murdo & Co.	,,	Hopkins & Williams	,,	Smeeton, W.	Leeds.
Dobbin, W., & Co., Limited	Belfast.	Hovenden, R., & Sons	,,	Southall & Co.	Birmingham.
Drew, Barron & Co.	London.	Johnson, J. H. & S.	Liverpool.	Sutton, W., & Co.	London.
Drew, B., & Alexander	,,	Langton, W., & Co.	London.	Tomlinson, Hayward & Co.	Lincoln.
Dunn & Company	,,	Lynch & Co.	,,	Treacher, Hodgkinson & Co.	London.
Edwards, W.	,,	Mackay, John, & Co.	Edinburgh.	Westwood & Hopkins	,,
Evans, Lescher & Webb	,,	Mander, Weaver	Wolverhampton.	Woolley, James	Manchester.
Evans, Gadd & Co.	Exeter.	Marsden & Sons	London.	Wyleys & Brown	Coventry.
Ferris & Co.	Bristol.	Maw & Son	,,	Yates & Co.	London.
Foulger, S., & Son	London.	Meggeson & Co.	,,		

After these public statements in a Court of Equity, and subsequent confirmation by the trade at large, no Chemist can conscientiously use or sell any other compound for Chlorodyne, without committing a breach of faith, unjust to patient and physician. The *value* of the remedy *alone* creates the great demand.

Sold in Bottles—1s. 1½d., 2s. 9d., 4s. 6d., and 11s. Usual Discount to the Profession.

SOLE MANUFACTURER,

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"THE BEST NATURAL APERIENT."

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The strongest known Mineral Water in the world. This remarkable Spa has been purchased by a syndicate of gentlemen, who have determined to make more widely known the extraordinary curative powers of this Spring, which contains more Iodine and Bromine than any Spring in Europe. An analysis of the water having been made in November, 1886, by Professor Wanklyn, M.R.C.S., corresponding member of the Royal Bavarian Academy of Sciences, Professor of Chemistry, a very important discovery has been made—viz., the presence of Free or Elementary Iodine.

Dr. WANKLYN says:—"So far as I am aware, this is the first instance in which free iodine has been found in appreciable quantity in a natural water. For many years the Woodhall Spa has been celebrated as a valuable remedy in skin diseases. The fact that it is a solution of free iodine is interesting in this connection, and well worthy of the attention of the medical profession."

The Woodhall Bromo Iodine Water is now being bottled at the Spring by the Sole Agents, BROMLEY & CO., Chemists, 233, High Street, Lincoln, 5 and 6, The Grove, Buxton, and Woodhall. All communications to be addressed to them at the Spa, Woodhall, Horncastle.

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A sovereign remedy in Chlorosis Anæmia, Gastralogy, Dyspepsia, Chronic Diarrhœa, Vesical Catarrh, Renal Colic, Gravel, and Gout. Its "Anti Lithique" action is demonstrated by the fact that it reduced to a fine powder a calculus which had been submerged in it for a month, and instead of producing the debilitating effects of purely alkaline water, it has the inestimable virtue of entirely eliminating the uric acid and fortifying the stomach.

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The following figures and facts will be interesting to the Members of the Association :—

Year.	No. of Members.	Dividend.
September 30th, 1878	119	None
,, 1879	350	None
,, 1880	430	None
,, 1881	540	None
,, 1882	615	3¾
,, 1883	708	5
,, 1884	908	6
,, 1885	1,193	6
,, 1886	1,463	6

The results of the Working for this period were as follows : 1879 being the first complete working year :—

		£	s.	d.
1879	Loss	260	13	8
1880	Profit	275	0	1
1881	,,	729	5	3
1882	,,	904	18	0
1883	,,	1,307	2	10
1884	,,	1,919	0	4
1885	,,	1,844	10	7
1886	,,	2,170	14	0

It may be thought that the year 1885 shows a falling-off in results, but that is not really the case, as in this year we tried the experiment of free delivery in London, which cost us about £600. We are now charging a small amount for delivery in town.

By referring to balance-sheet for this year you will find that £488 16s. 7d. had to be deducted for Harrogate law expenses, otherwise the profit would have shown a much larger increase over that of 1885.

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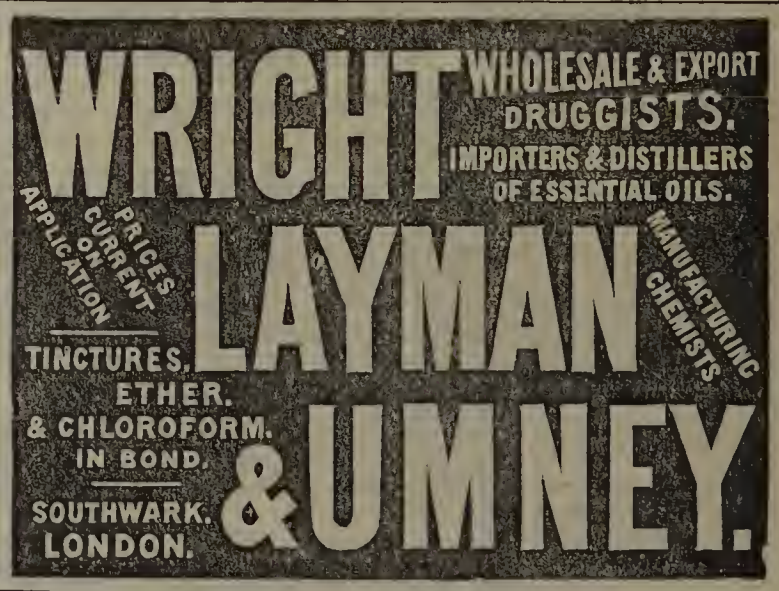

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OF THE

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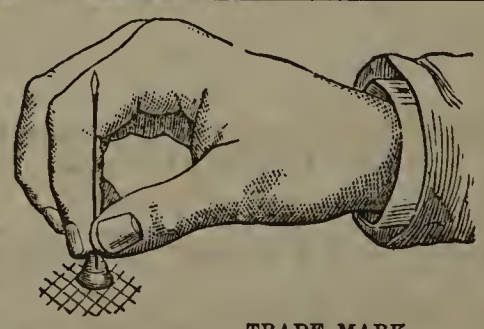

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„ W. PARKINSON	„ A. W. WOOD

Only **3** *other Candidates were successful in passing from all sources.*

MINOR.

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For sale, cheap, two large show carboys, cut stoppers, 30in. high; three specie jars, band labels and contents, 26in. high; two very handsome honey and tamarind jars; one large marble mortar and long pestle. H. J. T., 33, Albion Rd., Woolwich.

Bargains.—Seventy-six stoppered rounds, gold labelled, good as new; five jujube jars, shield labels, cost 7s. 6d. each; bent plate-glass counter-case, 22in. long, 10in. high; two 1 gal. carboys and stands, cut stoppers; one ½ gal. ditto; first P.O. for £4 10s. has the lot. MAHONEY, 723, Old Kent Rd., S.E.

A number of flat glass cases, various sizes, from 2ft. 6in. to 6ft. long, as fig. 2, to open at back, also some to open at top, to be sold very cheap, to make room, also a number as fig. 3; 2ft. long, 30s.; 2ft. 6in. long, 32s.; 2ft. 8in. long, 35s.; 3ft. long, 40s.; 3ft. 6in. long, 45s.; as fig. A 8, 5ft. long, 95s.; 6ft. long, £5 10s.; as fig. A 15, 9ft. long, £8; 5ft. 6in. long, £4 10s.; as fig. A 16, 3ft. long, 55s.; 3ft. 6in. long, 60s.; 3ft. 9in. long, 65s.; 4ft. long, 70s.; as fig. A 17, 4ft. long, 75s.; as fig. A 18, 5ft. long, £5; 6ft. long, £5 10s.; a splendid plate-glass counter case, 7ft. 8in. long, 23in. wide, 12in. high, glass ends, silvered-glass back, to open, £7 10s., a great bargain; toothbrush cases, as fig. A 9, 35s.; as fig. A 10, 50s.; 6ft. case, to open in front, plate-glass and mahogany stand, £8; a silvered plate-glass, in ebonised frame, 7ft. by 2ft. 9in., 75s.; a ditto, ditto, 7ft. by 2ft. 6in., £3 5s.; 7ft. mahogany dispensing counter and screen, fitted with sink and drawers, very elaborate, £12 10s.; several very massive wall cases, about 10ft. long, cheap. E. NATALI, 207, Old Street, E.C.

12ft. wall fixture, drawers, lockers, shelving, cupboards, and cornice, £8 10s.; 16ft. wall fixture (mahogany), silvered plate-glass cupboards between shelving, glass labels and glass knobs to drawers, £12 10s.; several others equally cheap; 9ft. wall case, as fig. A 88, but instead of being bent glass cases, between top and bottom cases there are sloping cases, £14; 5ft. wall case, as A 87, glass cupboards under, £8; 10ft. ditto, ditto, £15; 15ft. ditto, ditto, £18; 12ft. ebonised wall case, 8ft. high, £9 10s.; 7ft. wall case, ebonised, 8ft. high, £7; a number of solid mahogany-top counters, framed and moulded, pine stained and polished fronts, from 5ft. to 12ft. long, at 6s. per ft. run; also a number of black and gold fronted counters with mahogany tops, at 6s. per ft. run; 12ft. mahogany counter, £7 10s.; plate-glass fronted counter, £9 10s. E. NATALI, 207, Old Street, E.C.

Plate-glass sponge cases, fig. A 41, 65s.; ditto, ditto, as fig. A 43, 95s.; show steps, A 37, 50s.; as fig. A 39, 15s.; desk and glass case, A 31, 60s.; a ditto, ditto, 50s.; a number of dispensing screens, from 5ft. to 8ft. long, glass case at each side, with silvered plate glass in centre and marble slab in front, tablets on top of cases, and shelves at back for dispensing bottles, very elaborate, from £6 10s.; a 3ft. ditto, as fig. A 54, 45s.; 3ft. 6in. ditto, 55s.; 4ft. ditto, 60s.; 4ft. 10in. ditto, 70s.; 5ft., as fig. A 55, 95s.; 6ft, £5 10s.; 6ft. 6in., £6; 7ft. ditto, £6 10s.; and a quantity of other screens very cheap; several pair specie jars, Royal Arms, equal to new, on mahogany stands, from 24in. to 40in. high, price £4 to £6 10s. pair; several pair carboys, 10, 12, 14, and 16 gallons, with mahogany stands; a number smaller sizes; dome-covered pink ointment jars, gold labels, any names, 3s. 9d. each; a lot of second-hand green, blue, 3lb. and 4lb.; a ½-gal. displacement apparatus, fig. 53; black store bottles, 1 gal., with japanned caps, 1s. 3d. each. E. NATALI, 207, Old St., London, E.C.

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The Pharmaceutical Journal AND Transactions.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

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SECTION 5, CLAUSE 3.—"Any person qualified to vote desirous of nominating any Member for election as a Member of the Council or as an Auditor, shall give notice in writing, with the name and address of the nominee, and, if for the Council, disclosing whether such nominee be or not a Pharmaceutical Chemist, to the Secretary of the Society, *on or before the 24th day of March*, in every year; and the Secretary shall, on or before the 26th day of March then instant, address and send by post to each nominee a notice of his having been so nominated, and inquiring whether he will accept office if elected, and in default of a written reply from such nominee, declaring his readiness to accept office, if elected, being received on or before the 31st day of March then instant, such nominee shall not be deemed eligible or willing to be elected."

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held.

EVENING MEETING.

17, BLOOMSBURY SQUARE, LONDON.

An Evening Meeting of the Society will be held at 17, Bloomsbury Square, London, on Wednesday, April 13th, at half-past Seven o'clock.

The chair will be taken at Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Tuesday, April 5th, as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 11 a.m., on the second Tuesday in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself:—

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* A Certificate of having passed any of the examinations approved by the Council (a list of which may be obtained from the Registrar) will be accepted in lieu of this Examination, provided Latin, Arithmetic, and English were included in the subjects of the Examination for which the Certificate was granted.

The Certificate must be forwarded to the Registrar, with the fee of Two Guineas, for the approval of the Board of Examiners, and must be so approved before the Candidate is eligible to enter his name for the Minor Examination.

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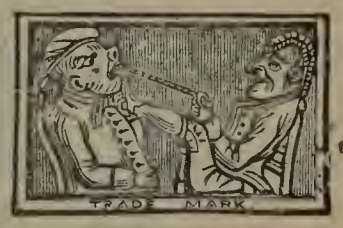

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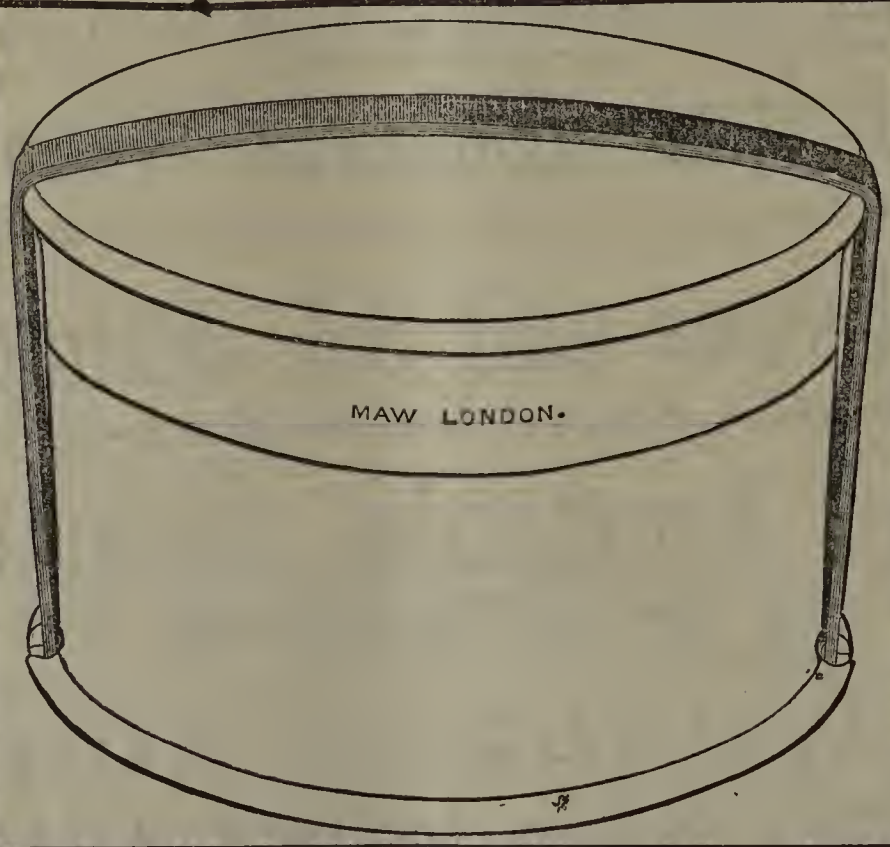

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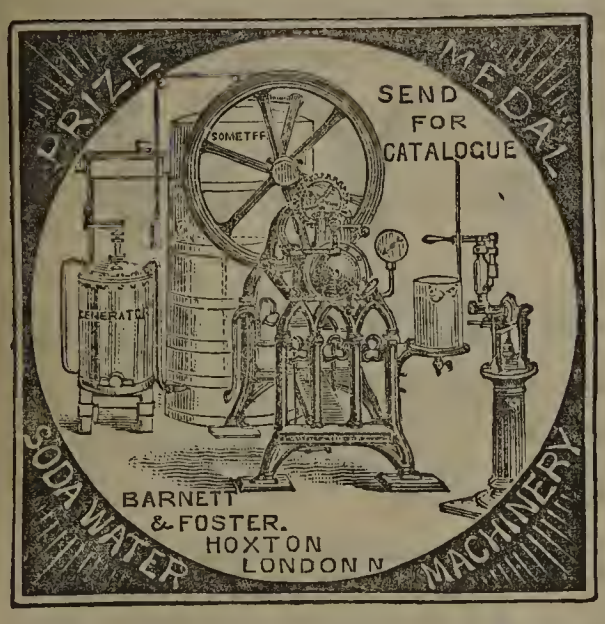

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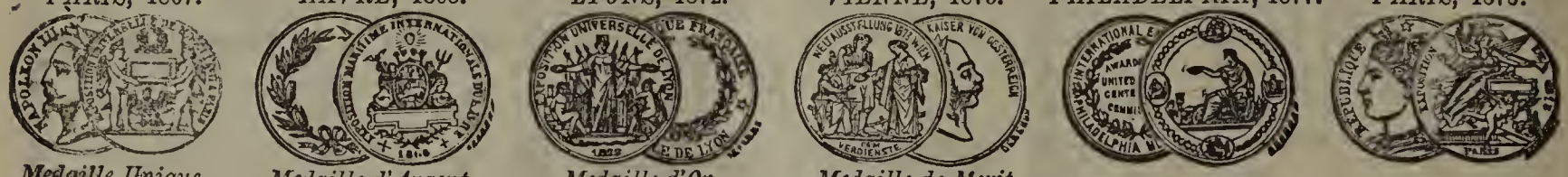

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NOTE ON THE PHARMACOLOGY OF STROPHANTHUS.*

BY H. D. ROLLESTON, B.A.,

Assistant Demonstrator of Physiology in the University of Cambridge.

Thanks to the courtesy of Messrs. Brady and Martin, of Newcastle, I was enabled to examine the physiological properties of strophanthus, the arrow poison or "Kombé" of African tribes, which, since Professor Fraser's address to the section of Pharmacology and Therapeutics at the British Medical Association at Cardiff in 1885 has been gradually attracting notice and now bids fair to be an exceedingly popular drug.

I received alcohol tinctures (1 in 8) of the seeds, the hairs and the pericarps as well as corresponding ethereal extracts, six preparations in all.

There being a good deal of oil in *Strophanthus hispidus*, Fraser directs (*Brit. Med. Journ.*, Nov. 14, 1885) that a watery solution of the alcoholic extract should be repeatedly agitated with ether; by this means the oil and colouring matters are removed, and since the active principle strophanthin is said to be practically insoluble in ether, no loss is sustained in the process.

In trying physiological experiments with the various preparations of the drug it was, however, found that the ethereal extracts contained an active principle, resembling that found in the alcoholic tinctures.

In all experiments with the ethereal extracts the ether was got rid of, so as to avoid the fallacy and interference in results from the action of the solvent on the heart, for though acting in an opposite direction, viz., killing the heart in diastole, the presence of ether would render valueless, if not completely vitiate, any experiment. For it is evident, that the death of the heart might be due either to the ether or the strophanthin contained in it.

The ethereal extract of the seeds was mixed with (distilled) water and the mixture concentrated on a warm bath (temperature 30° C.); by this means the ether was got rid of and drops of oil coloured green with chlorophyll were precipitated. On filtering, the bitter taste characteristic of strophanthin (Fraser, *loc. cit.*) was present in the filtrate. The aqueous extract of the ethereal extract thus obtained when given in small doses to frogs' hearts produced a slowing of beat with increased force, followed by a condition of systolic contraction with beats at intervals, superimposed singly or in groups of two or three. In stronger doses the heart became tonically contracted, with beats at intervals, passing into a condition of systolic rigour, with the ventricles pale and contracted, the auricle being usually contracted, but in some cases distended.

Given to dogs it produced marked increase in the force of the heart's beat and of the pulse, then slowing of heart's rhythm with some evidence of increased arterial tension, then irregularity of the beat, a very constant form after a comparatively large dose being one large wave, followed directly by a small one, then a pause; in some cases groups of beats being seen. The heart eventually stopped in diastole, sometimes greatly dilated.

The ethereal extracts of the pericarps and hairs were also found to be active, though not to such an extent as the ethereal extract of the seeds; between the two former the pericarps were rather more active, *i.e.*, contained more of the active principle. It may be noted in passing that the alcoholic tinctures of the seeds, pericarps and hairs were found to be active.

Hardy and Gallois (*Pharm. Journ.*, [3], vii., 756) state that in the hairs there is an active principle which they call ineine, with different physiological properties from strophanthin. The tinctures of hairs and the aqueous solution of ethereal extract of hairs have only shown evidence of containing strophanthin in small amounts, but further investigation is perhaps desirable.

At Professor Dunstan's suggestion experiments were tried with an ethereal extract prepared from anhydrous seeds with anhydrous ether. Professor Dunstan most kindly placed at my disposal two extracts prepared in this way.* The same positive result was obtained as in the case of the ethereal extracts I had previously examined.

Specimens of the oils of white and green strophanthus, prepared by Mr. Helbing, of the German Hospital (see p. 747), were examined and also found to be active.

It therefore appears that strophanthin is soluble in ether, at any rate when the oil is present, and that the ethereal extract is therefore of value, although I refrain from expressing any opinion on the purely pharmaceutical question of whether or not ether should be used in preparing the tincture.

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, March 9.

* One of these was prepared and sent to me by Mr. Martindale. Professor Ringer, of University College, is quoted (*Pharm. Journ.*, Nov. 20, 1886), as finding it not inert, though not very active. The other was prepared according to Fraser's directions (*Brit. Med. Journ.*, Jan. 22, 1887).—W. R. D.

RECENT DONATIONS TO THE MUSEUM.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

BAHAMA SPONGES

In the Bahama Court of the late Colonial and Indian Exhibition a fine series of the different commercial varieties of West Indian sponges was exhibited, and since its close a typical specimen of each of them has been presented to the Museum of the Pharmaceutical Society. During the last few years sponges have formed an article of considerable import from the Bahamas to this country, and a description of the different kinds met with in commerce may therefore be found useful for reference. In order to make clear the features in which the several commercial varieties differ, it will be necessary to refer briefly to the structure of these animals in a living state.

By zoologists sponges are classed as an order of the sub-kingdom Protozoa, the leading feature of which is that the animals included in the order consist of a composite mass or colony of small amœboid particles of gelatinous matter, supported by a skeleton, which consists either of a network of horny fibres or of calcareous or silicious spicules.†

Consequently, in the fresh state sponges present an appearance exceedingly different to that with which

† Of the last-named, the pretty "Venus flower-basket" (*Euplectella Aspergillum*) and the glass rope sponge (*Hyalonema mirabile*) are instances.

we are familiar, forming dark, unsightly masses of jelly, and it is only when the sarcode or gelatinous matter is removed that the skeleton, known as the sponge of commerce, becomes visible. In the living animal the surface presents a large number of minute orifices or "pores," and a few much larger ones, known as "oscules," or excurrent apertures. Both of these can be closed at the will of the animal. A current of water carrying food to the animal enters through the smaller openings, and is subsequently ejected through the larger openings or oscules. This current is set up by means of specially ciliated sponge particles contained in cavities below the surface of the sponge, the cilia waving in one direction only, like those of the mucous membrane of the lungs in higher animals; the ordinary particles of the sponge flesh possessing no cilia, but having only an amœboid movement. The openings in the gelatinous surface correspond to the openings visible in the horny skeleton, and it is by the character and the arrangement of these, as well as by that of the fibres, that sponges are classified both commercially and scientifically.

Until the discovery of sponges in the Bahamas and in the vicinity of Florida, all the sponges of commerce were derived from the eastern half of the Mediterranean sea, which still supplies the finest qualities. A great number of varieties, both in form and relative degrees of softness or hardness, are recognized; one London sponge merchant even asserting that there are as many as four hundred Mediterranean kinds. These varieties, whether of European or American origin, are referred by zoologists to three principal types:—

1. *Spongia officinalis*, L., which is the source of the Turkey cup sponge.

2. *Spongia agaricina*, Schmidt, affording a cup sponge of harder and more unyielding texture than the Turkey cup and known as the Zimocca sponge.

3. *Spongia equina*, Schmidt, yielding the bath or honeycomb sponge.

The first, according to Mr. Saville Kent,* is distinguished by its usually cup-shaped contour, by the exceedingly fine elastic and densely interwoven fibres of which it is composed, and by the oscules being more crowded towards the centre of the cup.

The second, or Zimocca sponge, is recognized at sight from the Turkey cup sponge—which it closely resembles in shape, although the cups are flatter and more saucer-shaped as a rule—by the fact that the larger openings, instead of being crowded towards the centre of the cup, are uniformly scattered at nearly regular distances over its whole upper surface, and by being much harder and more unyielding to the touch. The fibres are closely interwoven, as in the Turkey kind, but are coarser and less elastic. It is only one-third the value of Turkey sponge.

The third, or honeycomb sponge, has a more spheroidal or rounded form, flattened above, and the larger or excurrent openings are irregularly scattered over the upper surface. In this kind the erect or primary fibres are not visible.

The Bahama sponges correspond closely with the typical forms above described in general characters, and by Mr. A. Hyatt,† the American spongologist, are considered to be varieties of these species. He expresses the opinion, however, that the coarser varieties of the European sponges are finer, firmer, and more elastic than the finest of the corresponding American sub-species, the inferiority of the latter being attributed to the larger amount of foreign matter included in their primary fibres, the looser mesh of the fibres, which are comparatively coarse, and the larger and more numerous canals.

The Bahama sponges are referable, according to Mr. Hyatt, to the following sub-species:—

Reef, or glove sponge, to *Spongia officinalis*, var. *tubulifera*.

Sheeps' wool sponge, to *Spongia equina*, var. *gossypina*.

Abaco velvet and cay velvet sponge, to *Spongia equina*, var. *meandriniformis*.

Grass sponge, to *Spongia equina*, var. *cerebriformis*, and *Spongia graminea*.

Hardhead sponge, to *Spongia agaricina*, var. *typica*.

Yellow sponge, to *Spongia agaricina*, vars. *corlosia*, *dura* and *punctata*.

Reef, or Glove Sponge.—Although resembling Turkey sponge in the closeness of its mesh it is quite different in shape, being broadest at the base and convex or dome-shaped above, and sometimes compressed laterally. The oscules are fewer in number, rather large, and are often situated in a row opening on the top of the sponge. The texture becomes very brittle with age and is never so elastic as the Turkey sponge; being very soft and much cheaper than the latter (only about one-tenth its value), it answers very well for surgical purposes where it is necessary to renew the sponge frequently.

The glove sponges, as a rule, are of comparatively small size. They grow gregariously on a hard bottom or on reefs, five or six feet below the surface of the water, and sometimes are irregular or dendritic in shape, and are then much less valuable. Those known as reef sponges are similar in shape to the glove sponge, but are rather harder, and have the oscules more regularly distributed over the surface. Old specimens become very brittle and are easily torn. A third kind, scarcely distinguishable from the glove sponge by the eye, but harder even than the reef sponge to the touch, is described as a "hardhead" sponge.

Sheeps' Wool.—This variety corresponds most nearly with the honeycomb sponge of the Mediterranean, and is, indeed, an American variety of that sponge. It derives its name from the fact that the fibres of the external surface are developed in the form of little pointed tufts, which give the sponge a peculiar fleecy appearance. In its sub-spheroidal shape it resembles the Mediterranean honeycomb sponge; the larger apertures are distributed with comparative regularity over the upper surface, the fleecy tufts sometimes projecting and converging over the openings; the inner substance is honeycombed with large tortuous channels. This sponge is soft to the touch and is suitable for bath and toilet use, but is only one-half the price of the Mediterranean honeycomb sponge. It is found at depths varying from three to sixteen feet or more, the finest in size and fibre being found at the greatest depth. A sponge very similar in appearance to the sheeps' wool, but much harder to the touch, is met with, which is classed as a "hardhead" sponge.

* "Report on the Sponges of the Bahama Islands," by W. Saville Kent, p. 407, in 'Fisheries Exhibition Literature,' vol. v., part ii.

† 'Revision of the North American Poriferæ,' Boston Soc. Nat. Hist., 1876.

Abaco Velvet or *Boat Sponge.*—This sponge bears a general resemblance to the sheeps' wool in shape and size, but the superficial tufts of fibres stand out more distinctly and are more obtuse and somewhat broader. The most marked feature consists in the oscules being crowded in the centre of the sponge and there uniting to form one, or more rarely two, large openings which much depreciate its value. If the opening is closed by passing a thread round it and then drawing the sides of the aperture together the sponge will last much longer. In texture it is as soft as the sheeps' wool; it is quite suitable for toilet use, where a cheap sponge is required, and is about 25 per cent. cheaper than the sheep's wool.

Cay Velvet.—This sponge is a harder variety of the Abaco velvet, being much more resistant to the touch. It presents in a still more marked manner than that sponge the peculiar appearance like brain coral (*Meandrina*) which characterizes the velvet sponges. It is chiefly used by painters and for stables and domestic cleaning purposes.

Grass Sponge.—This is a soft sponge, rounded or oblong in outline, with the oscules crowded together on the upper surface, each oscule being generally surmounted by a short thin projecting tube of sponge fibre, which has a longitudinally striated appearance, quite characteristic of this sponge. Occasionally there are a few large openings at the side. Another very noticeable feature in this variety is that the projecting tufts of fibre are very slender and appear to be arranged in a somewhat regular manner in perpendicular lines, which, extending to the upper surface, give it a singularly radiate appearance. Although very soft and elastic, the grass sponge is easily torn, owing to the looseness of its fibre. It is quite soft enough for toilet use, and is only about one-third the price of the sheep's wool sponge.

Another form of the grass sponge is described by Mr. Hyatt under the name of *Spongia graminea*, and included by him under the grass sponges; it has a coarser texture and the internal tissue is very open, owing to the large size and central position of the larger openings. It usually has the shape of a truncated cone, and is fluted on the side with deep furrows, the truncated apex being either flat or funnel-shaped and the oscules appearing on the truncated apex. It is a gregarious form, growing only three feet below the surface of the water.

Hardhead.—The sponges that pass under this name do not form a distinct kind, but the term is applied to hard varieties of the above sponges; thus there is a hardhead glove and a hardhead sheeps' wool. The former appears to bear the same relation to the glove or reef sponge that the Zimocca does to the Turkey cup sponge.

Yellow.—This sponge is the coarsest and hardest of all the Bahama sponges. It presents a dome-like shape and exhibits on the upper surface a few, often slightly projecting oscules, which are large enough to admit the little finger. The superficial tufts of fibre have a branched appearance with finely fringed ends. To the touch the sponge is quite tough and hard, yielding only to considerable pressure, and its texture is brittle. It is fit for stable use or where a coarse sponge only is required, and is only about one-tenth the price of honeycomb sponge.

(To be continued.)

A SIMPLE NITROMETER.

BY THOS. P. BLUNT.

A description of the following instrument, the efficiency of which has been proved, may be of use to some readers of the *Pharmaceutical Journal*; the well-known rapidity with which a sample of spirit of nitre deteriorates, especially in summer, and with a bottle only partially full, renders a simple and easy—and at the same time efficient—method of testing it of great importance.

The nitrometer described below may be constructed for a few pence and used in five minutes. Two glass syringe tubes, of ½ oz. and 1 oz. capacity respectively, have their points connected by a piece of black feeding tube, on which is placed a pinch such as is used for burettes; no doubt the "stops" sold for nursery use would do as well. This is the nitrometer. It is graduated by pouring into the shorter tube half a drachm of water, the upper surface of which is then marked with an india-rubber band, or better by a file mark; another drachm is then poured in and the surface similarly marked. The longer tube is now graduated in the same way by pouring in successive drachms of water, up to eleven drachms.

To use the instrument the longer tube is placed in a vessel of brine deep enough to reach the neck; the form of the vessel, beaker, measure or pot, is of little importance. The clip is relaxed and the lower tube completely filled by sucking the upper one, any drops drawn into the latter being turned out, after again clipping tight. The upper tube is now filled to the 1½ drachm mark with the spirit of nitre to be tested, the clip is released, and the whole lifted out of the vessel of brine until the spirit of nitre has reached the lower mark, which means that the lower tube now contains one drachm of it. The excess is poured away, the tube rinsed, and the solution of potassium iodide and the dilute sulphuric acid introduced in the same way, the half drachm being rejected in each case; the object of this being to ensure the absence of air. After moving the lower tube gently up and down once or twice it is raised until the level of the fluid within and without it is equal, and the volume of gas is read off.

THE LAWS OF NATURE IN RELATION TO HEALTH.*

BY PROFESSOR JOHN ATTFIELD, F.R.S., ETC.

A Natural History Society has few higher functions than that of disseminating knowledge of the laws of nature. And of all the relationships of natural law, whether as regards the universe, the world, or mankind, few can have more widespread interest for man than those which conduce to his own welfare. That welfare may be regarded from personal points of view, as the religious and the hygienic, or from the general standpoints of politics and of society. Last year your President had the honour of addressing you on the laws of nature generally—the laws themselves—and some of their relations to religion; he now ventures to treat of their relation to health. He ventures to consider, for an hour, the broad natural principles that govern health; and to consider principles only, for the details would occupy a very long course of addresses.

* Presidential Address delivered at the Annual Meeting of the Hertfordshire Natural History Society at Watford, February 15, 1887.

Introduction.

Perfect health. Picture such health. The health of, say, full-grown youth under the most free and favourable conditions. Perfect physical health ; attended by perfect purity of mind and perfect strength of brain, associated with perfect development and cultivation of all the powers, and accompanied by freedom from all care and anxiety. Further, picture this health as commencing in the cradle, increasing in fulness towards manhood and womanhood, and extending to the age of a hundred or a hundred and four or five years, death then being only as the unawakening from sleep. That is perfect health.

Health more or less perfect, regulated by perfect natural laws. Endeavour for a moment to realize the general character of the more prominent of these laws. The comprehensive, far-reaching, all-pervading laws under which is supplied to us the light to which we wake in the morning and the warmth without which we should never wake ; the laws governing the poise and motion of the earth, the moon, the sun, and all the spheres of the universe, yet governing our position and our movements on the surface of one of the smaller planets at the bottom of a sea of air. Glance at the laws that influence our health through our comfort and our well-being, namely, laws which enable us to yoke the lightning to our wishes and so to transmit our messages in a moment to the uttermost parts of the world, or, again, laws which enable us so to harness the force of magnetism as to guide the mariner to his haven over the trackless ocean. Try to realize the broad character of the laws under which we obtain pure air, pure water, pure food, and all that charms the eye, the ear, and the other organs of sense ; and the laws that point to the character of the best clothing for the individual, the best dwelling for the family, and the best relationship of one dwelling to another in a community. These are some of the perfect, all powerful, irreversible laws of nature.

The manner in which and the extent to which health more or less perfect is governed by laws such as those just sketched is the subject of the present address. No one is so healthy but might be more healthy, and no one is so unhealthy but might be less unhealthy, by a proper apprehension and application of the all-sufficient laws of nature.

In the consideration of this subject, no doubt personal health must occupy the first place ; for the health of the aggregate in a house, a town, or a country, must chiefly depend on the personal health of each inhabitant. But a healthy individual, or a healthy family, or a healthy community, may be the cause, perhaps the innocent cause, of ill-health in another individual, or another family, or another community ; as, for example, when one person unwittingly gives fever to another, or when one or more persons draw pure water from a stream, but omit precautions that provide for the stream passing on pure to their neighbours. Therefore any comprehensive view of the laws of nature in relation to health must include the laws specially affecting the health of small and large communities, as well as the laws affecting the health of the individuals composing those communities. We must have healthy homes and healthy towns, as well as healthy individual inhabitants, for otherwise those inhabitants will soon cease to be healthy.

Ill-health will, in this address, only be considered incidentally ; that is to say, will only be alluded to as resulting from our ignorance of, or our nonconformity with, the laws regulating health. Ill-health once produced must be treated under a special set of laws applied by experts who have special knowledge respecting those laws. namely, by medical practitioners—a noble band of men, whose practice everywhere and always is to endeavour with the utmost practicable speed to reinstate in health those from whom that inestimable blessing has been temporarily withdrawn.

The maintenance of the physical health of the individual must, of course, largely be influenced, indirectly, by a healthily constituted, a well-stored and a contented mind, and by a pure and lofty standard of morals ; while the health of communities will largely be affected by the character of their æsthetical, social and political surroundings. Here, as everywhere, laws more or less obvious and more or less obscure are at work. These cannot, now, even be glanced at. Only the laws directly controlling physical health can be treated within the limits of the present address.

Our subject therefore shapes itself somewhat as follows. Personal health directly depends on the food we eat, the fluids we drink, the air we breathe, the clothing we wear. The health both of the individual and the family or household directly depends on the character of the dwellings we occupy. The health of the individual, the family and the community, directly depends on the relation of dwellings to one another in villages, towns and cities. Under this division of the subject, the laws of nature in relation to health will now be considered.

The Food we Eat.

Food is only a means to an end. Perhaps the best word to express that end is *work* ; but work done within us by, for instance, the heart, the lungs, or the matter of the brain, as well as externally by, for example, the hands, the feet, or the muscles of the back. Indeed, from the point of view of health, the work done by the various organs of the body in blood-circulating, breathing and thinking, is of far higher importance than the work done in sewing, walking or weight-carrying. The work of the heart or the lungs is, during life, regular, untiring, unceasing ; the works of the hands or the feet, irregular, intermittent, limited. Nay, the work of, say, the seamstress, the pedestrian or the coalheaver, only represents spare power at disposal over and above the power needed to carry on that work within the frame which life imperatively demands. An engine must first move itself : its spare power does the outside work. Be the work internal or external, however, food is the means by which the work is accomplished. "If any man will not work neither let him eat," said Paul. A far higher authority, the inflexible command of a law of nature, uttered without the agency of any human mouthpiece, decides that "if any man will not eat neither shall he work." Food and work are an equation, the one is the equivalent of the other ; here man's will is powerless, here he must bend to law.

Let us look into this matter of the correlation of food and work just a little farther. With the commencement of life we commence individual work ; for the work of the infant heart, lungs, and muscles generally, as, for instance, in crying and screaming, involves an equivalent and prior assimilation of animal food. Thenceforward the infant must take enough food to enable it to perform such outside work as crawling on all fours, walking, grasping, clasping. Not until much later must it carry weights. The less constructive inside work the child or youth has to do as it advances in age, the more power will it have at disposal for other inside work, as, for example, the work of the brain during education ; the more power, too, it will have at disposal for all outside work, whether at the workshop, the counter, or the tennis-lawn. Growth having ceased, a still larger proportion of brain and frame will be at the disposal of adults for work in the world outside themselves. In connection with the subject of the food we eat, nothing is more striking than this law of correlation as regards food and work.

The law of the dependency of growth on food is only less striking than that just mentioned, because more familiar to to us. So familiar, in fact, is this dependency of growth on the supply of food, from infancy to maturity, from birth to about twenty or twenty-one years of age, and so self-evident, that little need be urged in support of the law here, or of the inflexibility of the law. The child must absorb such mineral food as will provide

for the growth of bone, such nutritious food as will provide for the growth of flesh, and such fuel-like food as will enable it to maintain the warmth of its daily increasing bulk. Something, however, must be stated respecting the kind of food necessary for the purpose, and on the quantity; stated at once concerning bone-forming food, and afterwards as regards flesh-forming and warmth-giving foods. Bone must grow by additions of bone-material, both animal and mineral, and that material must be supplied in the food swallowed—must be, for this is no matter of opinion, it is a matter of law. But if not supplied; what then? If the mineral material is, say accidentally or ignorantly, withheld; what then? The child will have, one cannot say bones, but bone-shaped things made of the flexible animal material, a material resembling gelatine, but it will not have true bones. These bone-shaped things, looking like real bones, but lacking the firmness communicated by the mineral material, will give way under the weight of the body; the child will be ricketty. The child will have the "rickets;" a word equally expressive whether derived from the Greek or the Saxon; for if Greek it has reference to the result as a disease of the rhachis or spine, and if Saxon it has reference to the appearance of the child as resembling a heap or hump or rick, a small hayrick.

Here fond mothers will ask, "How can we avoid so dreadful a disease? how can we know which foods contain, or do not contain, this mineral material?" The full answer to that question would involve divergence into a lecture on certain chemical portions of physiology, which would be out of place. A short answer would be, "Avoid such mere starchy foods as arrowroot, and use such bone-forming flours as that of wheat'" But that is an insufficient answer. Better fall back on a principle, and reply, "First recognize and become familiar with the law; then trust to your love and your intelligence to find the right mode of applying the law." Let us all do what we can, by example and by precept, to aid the future parents of unborn generations to know more about themselves and more about the laws which govern the health of themselves and their descendants. If we read only good novels, and read only what is worth reading in newspapers, we shall have time not only to study but to become familiar with subjects more fascinating than those of fiction and infinitely more useful and elevating. If people spent less time in gossip about persons, they would have abundance of time for converse about things.

But, continuing the subject of the food we eat, we must pass from the relation of food and work, and the relation of food and growth, to the relation of supply and waste. And first as regards bone; respecting which, after what has been stated in connection with growth, very few additional words will be necessary. Growth having ceased when our first score of years has passed, only the daily waste of bone has to be made good. This is accomplished by daily eating a commensurately small quantity of bone material, contained so abundantly in many kinds of food that we need take no thought of the matter so far as regards preservation of health. The point now insisted on is that here, as always, man is the creature of law; to the extent of which bone is worn away by the daily work of life, to exactly that extent is the waste made good by fresh supplies of bone-material in the food.

All that has been stated respecting the correlation of waste and supply of bone-material is true of the waste and supply of muscle-material or flesh. The ceaseless alternation of contraction and expansion of heart or lungs, or any lifting with the arms or walking with the legs, or any work whatever, involves an exactly commensurate expenditure or waste of muscle-material, or of muscle-forming food, and this expenditure or waste must be made good by an income or supply of an equivalent amount of that material. How can we best live in accordance with this law of health? Here it is difficult to avoid being technical. Shortly we may say that muscle-material is found both in animal food and in vegetable food; mixed, however, with so many other substances that we cannot easily make its acquaintance in a separate or isolated form. But there is one familiar variety of it occurring in what is called the white of egg, or more exactly, albumen; and hence all the varieties of it are termed albumen-like or albuminoid constituents of food. Well, albuminoid substances are met with in most vegetable foods, and, generally in a more concentrated condition, in all animal foods. They are contained, for example, in a steak or chop, or in bread or potatoes. If, however, we have to perform a given amount of work, and must do it on a diet of beef or mutton on the one hand, or on a diet of bread or potatoes on the other, rest assured we shall have to eat more of the vegetable than of the animal food: the rules of arithmetic come in here as well as the direct laws of nature. But while there is no vast difference between vegetable food and animal food, science—which is a name for so much of nature's laws as is at present known—has nothing to say in favour either of an exclusively animal diet or of an exclusively vegetable diet. Men of science, perhaps in all blindness, cannot perceive that far distant time when animals shall no longer eat animals; when even dogs shall have ceased to love a bone, having become quite altered in nature—

> "With longer alimentary canals
> Suited to diet vegetarian."

The scientific hygieist fails to picture the period when our successors are to look back to the present flesh-eating days with incredulity; a period when our descendants' imaginations—

> "Aiming at fiction called historical,
> Will vainly try to reconstruct the times
> When it was men's preposterous delight
> To sit astride live horses which consumed
> Materials for incalculable cakes."

Before leaving the illustration of health-law afforded by correlative waste and supply of this muscle-material or flesh-material, a word must be said respecting, not the quantity, but the quality of the muscle-material supplied to the human system. So far as mere percentage of flesh-forming material is concerned, few articles of animal food excel the common vegetable seeds known as horse-beans. But man cannot digest the horse-bean; a fact which serves to show that to maintain health we must not only select food of the right chemical quality, but also of appropriate physical condition. The chemical usefulness of muscle-making food as coarse as that just mentioned is not lost to us. We give it to lower animals, and they convert it into what for us is more or less tender assimilable meat. As to variation in the power of assimilating food possessed by different individuals, that is a matter of ill-health rather than of health, and therefore is outside the scope of the present subject. Defective assimilation must be treated by the expert in matters of ill-health, that is to say, by the practitioner of medicine. Only when assimilation is satisfactory will "good digestion wait on appetite, and health on both."

From the laws governing the frame's income and expenditure of bone-making substances and flesh-forming materials, we pass to the laws illustrated by the last of the three great classes of food, namely, warmth-giving aliments. Most of the bread we eat; the greater part of potatoes; a large proportion of farinaceous puddings, pie-crust, and cakes; sugar; butter and the fat of meat: all these are useless for bone-making and more or less useless for flesh-forming. Their chief office is, apparently, to burn within us night and day; thus maintaining that warmth of the body without which we could not exist for a moment. Not more certainly does fat or oil burn in a firegrate or lamp and give heat than it burns in the human body and gives heat. Further, a given quantity of fat or oil, when fully burnt, affords a given

quantity of heat, and always the same quantity of heat, whether the fat be burnt in a stove, a lamp, or the human body. If we burn an ounce of butter in an appropriate vessel, in the ordinary way, the whole of the heat is evolved in a short space of time, and gives so intense a temperature that we speak of it as raising a thermometer to perhaps a thousand degrees. If we gradually eat an ounce of butter in the ordinary way and thus burn it in the body, we get the same total amount of heat from it as before, but that heat is evolved in a far longer space of time, and maintains the body during the whole of that time at about 98 degrees—the average temperature of the body. Not only does fat thus burn in the body, but all the other substances just mentioned similarly burn, maintaining the whole system at about 98° F. Some of the farinaceous foods mentioned may be converted in the body into fat, and this fat may be stored within us, occasionally to an inconvenient extent, but it is only stored and will certainly during life sooner or later be burnt. It is only right to add that in place of so much heat some other force may be yielded by fuel-like foods, and thus the system be able to perform a certain proportion of its work by aid of the force yielded by such foods.

To sum up respecting the food we eat. A healthy man—taken as the type of all men, all women, all children—may be regarded morally, mentally, physically. His moral and mental health are not now being considered, only his physical health, and, indeed, only his physical health in relation to the laws of nature—especially, just now, the laws of nature which govern the food he eats. Viewed thus physically, man is, like an engine, no doubt a wonderful structure; but, secondly, he is, like an engine, a structure destined to do wonderful work by the aid of what is daily supplied from without. If he is to grow healthily, and to maintain his grown structure in health, he must perfectly assimilate perfect materials, that is, food than will yield him bone, flesh, and warmth. If he is to do sound work internally for himself, and externally for himself and for others, he must be fed with materials that are convertible into such work, materials which are force-holding and force-yielding. Must be, not may be; for he is an absorbing and a radiating focus of irrevocable, irreversible, unchangeable, all-perfect laws. To the extent to which men and women, and young men and maidens, realize the existence of, and can place themselves in harmony with, these laws—eating neither too much nor too little of appropriate, well-selected, and, if cooked, properly cooked and tastefully served food, and avoiding rich luxurious living—to that extent will they have perfect physical health, so far as health is dependent on food. The farther we recede from savagery and advance in civilization, the less can we trust to instinct and the more to knowledge, respecting the kind and the amount of food appropriate for healthy life.

The Fluids we Drink.

A very large proportion of our flesh and a certain proportion even of our bones consists of water; about one hundred pounds of water being thus included within, and forming an integral part of the flesh and bones of an adult of the average weight of one hundred and forty pounds. In breathing out the air from our lungs it carries off some of this water, which is, in fact, visible on a cold day as a little cloud in front of our mouths. The water thus breathed out every moment of our lives, awake or asleep, must be replaced by water, drunk with our food or at other times. For every half pint of water thus lost half a pint of water must be drunk; because the average proportion of water in the body must for various chemical and mechanical reasons be maintained. Once more, be it observed, the case is one of must be, not may be; for it is a case of unalterable law. "But," say a few "we never drink water, we always drink beer;" some others remark, "We rarely drink water, we generally drink tea or coffee;" while a child might say, "I drink quite as much milk as water." Forgive me, my friends, for seeming to contradict you, but you one and all probably drink quite as much water as those who drink little but water. Of 100 quarts of milk about 87 quarts are water; of 100 pints of beer nearly 90 are water; of 100 cupfuls of that favourite beverage you pour out of the tea-pot at least 99 cupfuls are water. Of 100 bottlefuls of claret, hock, or champagne, between 80 and 90 are water: of 100 bottlefuls of port or sherry wine quite 75 are water. Of those tumblerfuls of "grog" in which some people occasionally indulge—even if the gin, rum, brandy or whisky be strong, and the proportion of 'spirit" and water be half and half—three quarters of the tumblerful will be water; for the strongest spirits are usually half alcohol half water. When a man swallows a glass of "neat" spirit, therefore he is really taking alcohol diluted with water. It is a question whether any man could have much undiluted alcohol in his stomach and live. Even the glass of ardent spirit is diluted as soon as swallowed by the fluids then within, or immediately afterwards within, the stomach. It is a question indeed whether a man could live long if he took water in no other form than that of port, sherry or strong grog; that is to say, no tea, no coffee, no milk. Nay, the demand of the system for water probably could not be supplied if the only drink were the weaker wines. (It is to be remembered also that all solid food contains water—ordinary meat, poultry and potatoes 75 per cent.; many vegetables 80 or 90 per cent.; bread 40 per cent.). To maintain healthy bodies in their normal condition, and to enable them to do their life work, they *must* have water. And they *must* have a full proportion of water, no matter what the idiosyncrasy of the individual. If they do not get it they become unhealthy, or die outright.

Doubtless the fluids we drink are important from other points of view than that of their water. The 13 per cent. of solids in milk consist of valuable bone-making, flesh-forming and warmth-giving materials. Beer, wine, tea, coffee, etc., also contain small quantities of useful dissolved solids. But these solids are to be regarded as a part of the foot we eat. So that the interest of the fluids we drink, considered as fluids, derives that interest almost solely from the water they contain.

From the standpoint of nature, some little interest—and from the standpoint of man, a great deal of interest—attaches to the use of stimulants in the fluids we drink; for it would seem to be not more instinctive to man to cook his food than to discover in nature, or by more or less of art to manufacture, substances which are almost purely stimulating principles. The instinct of man in his uncultured and uncivilized state, and in widely separated countries, has led him to discover just those four or five plants, which even now so far as we know are the only plants that, like the tea plant, contain one and the same stimulant. Nearly everywhere also man's needs seem to have led him to the process—a perfect by natural process, by the way; an accompaniment of the growth of the yeast plant—by which sugar is converted into the stimulant termed *alcohol*. What is the use of such stimulants? Taken *in excess* they are poisons more or less insidious and harmful. The *theine* of tea, coffee, maté and guarana, is least liable to be taken in excess, and is least harmful. Alcohol is most likely to be taken in excess, and is therefore most harmful; or, in the epigrammatic words attributed to the Scythian prince Anarcharsis, "The first draught serveth for health; the second for pleasure; the third for shame; and the fourth for madness." If mankind, especially in civilized countries, would consent to live at a slower rate, the second draught would be unnecessary, and probably even the first. But mankind cannot now thus live, apparently.

"Man's life was spacious in the early world:
It paused, like some slow ship with sail unfurled
Waiting in seas by scarce a wavelet curled."

Now with civilization has come the stimulation of alcohol or theine. The first draught and the second are taken by most of the youth and nearly all of the adult of both sexes, either as theine or alcohol; while as alcohol the third and the fourth are taken by sadly too many. Children do not need, and indeed rarely take either alcohol or theine, nor for that matter either pepper or mustard, with their food. These things are mere stimulants. They are not used in the early life of the individual, they were not used in the early life of the race. But swallowed in proper and moderate quantities, at proper times, in these days of civilization, what office do stimulants fulfil in the system? "It would seem," as stated elsewhere by the writer, "that they do the important work of aiding the system, whenever necessary, to digest and to store up food, and to utilize its existing stores of fat and of flesh. A stimulant does some such work as this, whether it belong to the tea class, like the powerful coca; the alcoholic class, as, for example, brandy; or the clear soup class, as, for example, beef-tea. In other words, the purpose of stimulants is, apparently, to stimulate the system the better to live upon itself, and the better to replenish its store of life-sustaining, work-performing, flesh and blood. The imprisoned miner, having no food ordinarily so called, but having stores on his own frame, is able to exist for many days, if only, by a periodical sip of brandy, he can stimulate his organs to utilize those stores. Of course he daily gets thinner, the elements of his thus used flesh passing away as gases and vapours from his lungs and skin. The Indian performs a journey of two or three days on foot without any so-called food; but he really lives and works on the flesh stored in his frame, and lives satisfactorily if only he can chew his coca leaves, and so obtain the stimulus that shall induce his flesh to yield so much extra force. Of course he, too, daily decreases in weight, and must afterwards renew his jaded body by rest and nourishing food. The invalid, unable to take solid food, can generally take stimulating beef-tea, and thus stimulate his own flesh to maintain his life until he again is able to take true nourishment. That he loses flesh in the process is generally too apparent. These are extreme cases of what appears to be the ordinary action of stimulants when taken in proper quantities."

Even without the aid of stimulants all persons can fast, that is, live on their own flesh, for a certain length of time, without much risk of life, although with more or less of suffering. And with commensurate risk they may thus survive—one hesitates to say live—for a longer period, especially if stimulants are taken, and, of course, water. The greater the store of flesh and fat the victim has to begin with; secondly, the greater his powers of slowly but continuously subsisting on—we cannot quite say eating—that store; thirdly, the stronger his power of endurance; and, fourthly, the less external work he has to do: we say the greater his advantages in all these respects the longer will he be able to fast. If the victim is a willing victim—one of the so-called fasting men or women—he or she, so far as nature's laws are concerned, merely illustrates nature's power of working in an unusual direction when nature is foolishly prevented from working in the usual direction. So far as the person himself or herself is concerned, and all who aid or abet, the exhibition is senseless, contemptible, and degrading.

To sum up respecting the fluids we drink. While a few of them, as milk, contain true food, and while some of them, as beer, tea and wine, contain a stimulant, they all consist chiefly of water, and their power of quenching thirst resides solely in their water. The water in these fluids, and the water we drink as water, performs the two important functions of (*a*) by virtue of its solvent powers, conveying the food we eat to every part of the frame; and (*b*) by virtue of its fluidity, maintaining the otherwise solid and rigid tissues of our system in that elastic and pliable condition essential to life and to activity. Nature demands that water, and water alone, shall fulfil these functions; the fulfilment being governed by exact chemical and physical laws.

The Air we Breathe.

A whole series of beautiful natural laws, those which we term chemical and physical laws, regulate the composition of the air we breathe, and regulate its temperature, pressure, purity, and its other properties on which, in a greater or less degree, the maintenance of health depends. The burning within us of the fuel-like portion of our food, already mentioned as maintaining our warmth, is accomplished by the air inspired by our lungs under laws more especially studied by the chemist. The poisonous product of that combustion, expired from the lungs, passes away into the air from the region of the mouth and nostrils, under the laws, chiefly of heat and of diffusion, more especially studied by the physicist—as explained in the previous anniversary address. Again, between the pure air and food we take in on the one hand, and the used-up air and other products we give out on the other hand, there are formed within us numbers of compounds under laws more especially studied by the physiologist. The meteorologist takes note of the effects of those physical laws which govern the pressure, temperature, and moisture of the air; effects which so much influence the comfort and the health generally of man. The study of each and all of these laws relating to the air we breathe is of unbounded interest, and would afford pure and unending pleasure to any student; but especially would the study charm and delight the student investigating them for purposes of mental recreation. At the same time, the breathing of air is so much less under our control than the eating of food or the drinking of fluids, that the majority of persons cannot be expected to find that interest in the study which it is capable of yielding. We are connoisseurs in the matter of eating and drinking, or we think we are; while we take the air pretty much as it comes, having, in fact, no choice in the matter. We do something in cold weather towards warming, and a little towards changing the air of inhabited rooms, subjects that will be noticed in connection with that of the dwellings we occupy; and the inhabitants of large towns have done something, though not so much as might be done, towards diminishing the volumes of grosser impurities discharged into the air from chimneys, impurities which convert a cheerless enough cloud on the ground into a choking and blinding fog. Beyond this man feels so powerless over the air he breathes, that for the most part he treats its rich materials for thought with a shrug, or at least with a *non possumus* spirit. Added to all this, varying conditions of the atmosphere do unquestionably produce effects on health that at present we cannot explain; effects that are scarcely referable to dryness or moisture, coldness or warmth, greater or less volume, or other known conditions. There is still much in connection with the air we breathe that is mysterious. It may, however, be worthy of notice that the scientific chemist has long suspected that some of the effects of vitiated air, and certain effects of normal air, are due to organic matter rather than to alterations in the proportions of natural constituents, a suspicion confirmed recently by the microbiologist, who, while finding abundance of those minute forms of life termed microbes in the atmosphere of cities and the air of a sick room, finds fewer in the air of the plains, and scarcely any in the air of mountains a few thousand feet high. What may be the exact connection between the presence of aerial microbes and the health or ill-health of man remains to be discovered—a discovery, we may add, that will certainly, sooner or later, be made: for it would seem as if all such so-called secrets of nature were merely truths veiled by the haze of our own imperfect understandings; such a haze as always disappears before the earnest, patient, untiring, humble, skilful seeker after truth.

(*To be continued.*)

MEDICATED PENCILS.*

Dr. Unna, of Hamburg, has introduced a new form of applying a variety of remedies in form of thin sticks or pencils, in the same manner as nitrate of silver is applied. Dieterich gives a list of these preparations in the *Pharm. Centralhalle.* The distinguishing title or name chosen for this form of medication is *Stilus dilubilis* ("Pasten-Stift").

The mass from which these pencils are made is prepared from starch, dextrin, sugar and tragacanth. These are carefully mixed to a uniform powder, enough water added to make a plastic mass, and this mass is rolled out to strings of $\frac{1}{5}$ inch in thickness, or made by pressing the mass through suitable orifices in a press. These strings or pencils are dried upon parchment paper at the ordinary temperature, and then wrapped in tin-foil. At one end of the pencil, the label is affixed.

1. *Stilus Acidi Salicylici Dilubilis* 10 per cent.

("10 per cent. Salicylic Pencil").

Salicylic acid	10 parts.
Tragacanth, pd.	5 „
Starch, pd.	30 „
Dextrin	35 „
Sugar, pd.	20 „
Water	suff. quant.

Yields 40–45 pencils.

2. *Stilus Acidi Salicylici Dilubilis* 40 per cent.

("40 per cent. Salicylic Pencil").

Salicylic acid	40 parts.
Tragacanth, pd.	5 „
Starch, pd.	10 „
Dextrin	25 „
Sugar, pd.	20 „
Water	suff. quant.

Yields 45–48 pencils.

3. *Stilus Arsenico-Sublimati Dilubilis* 10 *et* 5 per cent.

("10 per cent. Arsenic and 5 per cent. Sublimate Pencil").

Arsenious acid, pd.	10 parts.
Corrosive sublimate, pd.	5 „
Tragacanth, pd.	5 „
Starch, pd.	30 „
Dextrin.	30 „
Sugar, pd.	20 „
Water	suff. quant.

Yields 39–41 pencils.

4. *Stilus Cocainæ Dilubilis* 5 per cent.

("5 per cent. Cocaine Pencil").

Cocaine hydrochlorate, pd.	5 parts.
Tragacanth, pd.	5 „
Starch, pd.	35 „
Dextrin.	35 „
Sugar, pd.	20 „
Water	suff. quant.

Yields 48–50 pencils.

5. *Stilus Ichthyoli Dilubilis* 20 per cent.

("20 per cent. Ichthyol Pencil").

Sodium sulpho-ichthyolate	20 parts.
Tragacanth, pd.	5 „
Starch, pd.	30 „
Dextrin	35 „
Sugar, pd.	10 „
Water	suff. quant.

Yields 39–40 pencils.

6. *Stilus Iodoformi Dilubilis* 40 per cent.

("40 per cent. Iodoform Pencil").

Iodoform	40 parts.
Tragacanth, pd.	5 „
Starch, pd.	10 „
Dextrin	30 „
Sugar, pd.	15 „
Water	suff. quant.

Yields 32–33 pencils.

7. *Stilus Pyrogalloli Dilubilis* 40 per cent.

("40 per cent. Pyrogallic Acid Pencil").

Pyrogallic acid	40 parts.
Tragacanth, pd.	5 „
Starch, pd.	13 „
Ether. ext. annatto	2 „
Dextrin	20 „
Sugar, pd.	20 „
Water	suff. quant.

Yields 40–41 pencils.

[The ethereal extract of annatto directed in the formula is specified to be that prepared by Gehe and Co. The object of this addition is not stated.]

8. *Stilus Resorcini Dilubilis* 40 per cent.

("40 per cent. Resorcin Pencil").

Resorcin, pure	40 parts.
Tragacanth, pd.	5 „
Starch, pd.	10 „
Dextrin	25 „
Sugar, pd.	20 „
Water	suff. quant.

Yields 39–40 pencils.

9. *Stilus Saponis Kalini Dilubilis* 60 per cent.

("60 per cent. Potash-Soap Pencil").

Anhydrous potash-soap	60 parts.
White bole, pd.	40 „

Knead them together. This yields 32–34 pencils.

Note.—Anhydrous potash-soap is obtained by heating soft-soap (potash-soap) in a steam-bath under constant stirring with a broad wooden spatula, until it no longer loses weight.

10. *Stilus Sublimati Dilubilis* 10 per cent.

("10 per cent. Sublimate Pencil").

Corrosive sublimate, pd.	10 parts.
Tragacanth, pd.	5 „
Starch, pd.	25 „
Dextrin.	40 „
Sugar, pd.	20 „
Water	suff. quant.

Yields 44–45 pencils.

11. *Stilus Zinci Oxidi Dilubilis* 20 per cent.

("20 per cent. Oxide of Zinc Pencil").

Zinc oxide.	20 parts.
Tragacanth, pd.	5 „
Starch, pd.	30 „
Dextrin.	25 „
Sugar, pd.	30 „
Water	suff. quant.

Yields 32–34 pencils.

12. *Stilus Zinci Sulpho-carbolatis Dilubilis* 20 per cent.

("20 per cent. Sulpho-carbolate of Zinc Pencil").

Zinc Sulpho-carbolate, pd.	10 parts.
Tragacanth, pd.	5 „
Starch, pd.	25 „
Dextrin.	30 „
Sugar, pd.	20 „
Water	suff. quant.

Yields 35–36 pencils.

* From *Pharm. Centralh.* Reprinted from the *American Druggist*, February.

THE CHEMICAL NATURE OF PETROLEUM OINTMENT.*

BY C. ENGLER AND M. BOEHM.

From an interesting paper, by C. Engler and M. Boehm, in *Dingler's Polytechnisches Journal* (vol. cclxii., p. 468), we take the following abstract, after stating that the term *vaseline* is applied by the authors (as, indeed, quite commonly on the continent of Europe) to the commercial petroleum ointments, irrespective of any special manufacturer's product. The word "vaseline," according to American patent laws, is the property of a single firm, and cannot be used by others. In Europe, however, the term has long escaped the bondage of proprietorship, and is used quite promiscuously.

Regarding the chemical nature of vaseline, only a few investigations are on record. Rud. Wagner† designated it as a mixture of heptane (C_7H_{16}) with paraffins. Moss‡ regarded it as a mixture of different, easily-fusible paraffins. Miller considered vaseline and "cosmoline" (which latter is a vaseline of higher melting point) as mixtures of paraffin with volatile hydrocarbons. Naylor§ finally showed that cosmoline contains 98·59 per cent. of hydrocarbons, and that fractions of different melting points may be separated from it by fractional cooling of its ethereal solution.

Most of the investigations refer to its physical or external properties (such as solubility, resistance to acids and chemical reagents, admixture of sulphuric acid, sulphonic acids, etc.), and it is just with reference to these properties that much discussion has been had up to the present time, whether the product obtained from petroleum residues (which the authors here designate as "natural vaseline" or simply "vaseline") or a mixture of heavy paraffin oils with ceresin (which the authors designate "artificial vaseline") is preferable.‖

It has long been known¶ that vaseline may be obtained, not only from the residue of American (Pennsylvania) petroleum—from which it was first prepared—but also from the residues of Galician and Alsatian petroleum. And Mendelejeff and Briel** have shown that a vaseline similar to the American may also be prepared from Caucasian petroleum.

According to Gerstenberger,†† the natural vaselines show slight differences in melting points and specific gravity, which are dependent upon their source and mode of preparation. In their principal properties, however, they do not differ materially. On the other hand, considerable differences have been shown to exist between natural and artificial vaselines, which should be kept in view when using the two substances practically. (Compare at end of this paper).

The investigations of the authors refer almost exclusively to the *natural vaseline*.

This excellent base for ointments may be obtained from petroleum residues either by decolorizing with charcoal, or by "bleaching" the residues with concentrated sulphuric acid, sometimes with the addition of bichromate, and subsequent treatment with charcoal, or, finally by distilling the bleached or unbleached residues.

Since the authors desired to examine vaseline in its natural condition, they purified it for their purposes merely by bone-black. The treatment with sulphuric acid causes the elimination of certain groups of hydrocarbons (of the composition C_nH_{2n}; also some aromatic ones). And even distillation produces changes which materially affect the composition of the product.

Preparation of Vaseline.—The authors used for this purpose two varieties of petroleum furnished by Dr. Fedorowicz, of Ropa, in Galicia. Both of these were strongly dichroic, green by reflected, yellowish to brownish-red by transparent light, and showed the following behaviour on distillation, the several figures given indicating the fractions, by volume or weight, respectively obtained at the stated temperatures:—

	Sp. gr.		Bel. 150°.	150° to 290°.	290° to 340°.	Over 340°.
I.	0·812	p.c. vol.	30·2	35·9	5·3	27·7
		p.c. w't.	26·7	35·5	6·5	31·1
II.	0·820	p.c. vol.	21·8	51·7	8·8	17·0
		p.c. w't.	20·0	51·2	9·4	18·9

From these oils the vaseline was prepared in two different ways:—

1. By dissolving the residues in petroleum-ether, bleaching the solution with bone-black, and evaporating the solvent.

2. By bleaching the petroleum itself, and distilling until a product of the proper consistence remained.

First Method (from Residues).—As the residues, deprived of all fractions boiling below 340°, had still the consistence of syrup, another portion, about one-third, was distilled off, until the residue had the consistence of butter. One part of this was then dissolved in 7 parts of petroleum-ether of specific gravity 0·66, and treated with 1½ parts of powdered bone-black for one or two hours. It required seventeen successive operations to render the magnificently fluorescent solution as colourless as water. After distilling off the solvent with steam, the vaseline remained behind as an odourless, tasteless, and colourless oil of strong fluorescence, which congealed after awhile to a white, very translucent salve-like mass.* This was found to consist purely of hydrocarbons. Its melting point was 32° C. (ab. 90° F). During cooling it exhibited not a trace of crystalline structure, nor were any signs of crystallization traceable in the precipitates obtained by cooling its hot alcoholic solution. This is contrary to Naylor's observations. But the portion previously separated from it by distillation (to render it denser), when treated in the same manner, separated numerous scales of paraffin.

Second Method (from Petroleum).—In order to avoid the laborious repeated boiling of the petroleum with bone-black, and subsequent filtering, the oil was bleached by passing it through a series of filters arranged after the plan of sugar house filters. Each of these was about thirty inches high, two inches wide, surrounded with a steam jacket, and contained 1¾ to 2 lbs. of bone-black. The oil became colourless usually after passing six of these filters, but it still possessed then a deep-blue fluorescence. Its specific gravity had at the same time been greatly diminished.

I. From 0·812 to 0·795.
II. From 0·820 to 0·782.

In order to obtain the vaseline from these bleached oils, they were subjected to distillation *in vacuo* (at 10 to 15 mm. pressure) up to a temperature of 250° C. The flask was immersed up to the neck in an air-bath heated to the required temperature. The yield and character of the products were as follows:—

	Yield.	Sp. gr.	Melt. point.
I.	13·8	0·8809	30°–31°
II.	13·2	0·8785	30°–31°

In determining the melting point, it is preferable to use Wimmel's method,† since these substances pass from a

* From the *American Druggist*, February.
† *Dingler's Pol. Journ.* (1877), vol. ccxxiii., 515.
‡ *Pharm. Journ.* [3], vol. vi., p. 623.
§ *Pharm. Journ.* [3], vol. vi., p. 707.
‖ This is a preparation of the last Germ. Pharm. entitled: *Unguentum Paraffini*, with the synonyms "vaselinum; vaseline." It is prepared by mixing 1 part of solid paraffin and 4 parts of liquid paraffin.
¶ *Chem. Centralbl.*, 1882, 319.
** *Jahresb. f. reine Chem.*, 1882, 1458, 1466.
†† *Chemiker Zeit.*, 1885, 1398.

* It is probably in this or some similar manner that the most beautiful of all petroleum ointments, the so-called Caucasine, is prepared.
† *Zeitsch. f. anal. Chem.*, 1868, 267.

strongly translucent into a perfectly transparent condition long before they have attained the melting point proper.

The authors then give the results of analytical determinations f the components of these products. Prepared by either method they were found to consist purely of hydrocarbons. Even the bleached oil itself was free from oxygen or sulphur, and the oils removed by distillation are richer in hydrogen and poorer in carbon than the corresponding residues.

The authors next turned their attention to the nature of the substance abstracted by the bone-black. For this purpose portions of each of the crude oils were distilled *in vacuo* in the same manner as the bleached oils. The residues thus obtained, and not further purified, were found to be free from nitrogen, but contained unweighable traces of sulphur, and the following percentages of oxygen (determined by difference):—

I. 0·46 per cent. II. 1·29 per cent.

Hence, the approximate results of the treatment with bone-black consist in the removal of the oxygenated compounds. Besides, the charcoal retains also certain constituents containing less hydrogen, so that the product has been rendered richer in *saturated* hydrocarbons.

Effects of Distillation.—In order to ascertain how much the melting point of vaseline may be raised by distilling off a portion, and also to determine whether its chemical nature is altered during this process, portions of each of the two crude oils were distilled, *in vacuo*, in fractions, until only a few drops of residue remained behind. It was thereby shown that the melting point of the *distillates* gradually rose with the temperature, while on the other hand the *melting point of the residue* rose only (from 30·5° to 32° to 33° C.) by taking off the first fraction; subsequently, however, it *sank in a continuous ratio.* This proves that by distilling vaseline *in vacuo* its melting point can be raised at most only by 2° or 3°, while on further distillation it sinks again, probably in consequence of slight decomposition.

In these experiments it was particularly remarkable that every one of the *distillates* had a strongly *crystalline* structure, while the residues, down to the last portion, possessed the amorphous condition peculiar to vaseline.

Since the whole appearance of the distillates showed that they consisted of a mixture of solid paraffin with volatile oils, attempts were made to separate these portions. It being impossible to accomplish this by filtration or expression, the authors employed a method depending upon the fact that from an ethereal solution of the mixture alcohol precipitates the paraffin more readily than the oils. The process is as follows (and may be used on the small scale):—The mixture of paraffin and oil is dissolved in the least possible quantity of cold ether, and the resulting solution is mixed under strong agitation with absolute alcohol until it is completely filled with flakes of paraffin. It is now strained, and the alcohol still adhering to the flakes evaporated on the water-bath. The strained or filtered liquid is then further mixed with absolute alcohol, the separated paraffin again removed, and this process repeated until no more flocculi of solid paraffin, but only oil globules are precipitated. From the final filtrate the ether and alcohol are removed by distillation, the residue dissolved in the least quantity of ether, and the solution (placed in a freezing mixture) treated with very little cold absolute alcohol, which causes a further separation of paraffin. This is likewise repeated until only oil separates. In order to obtain accurate results it is advisable to subject the paraffin first separated to a renewed treatment by dissolving it in ether and reprecipitating with alcohol The authors tested this method by employing it upon a mixture prepared by melting together 30 parts of liquid paraffin and 10 parts of solid paraffin (melting at 56° C.). The first separation yielded 16·1, and the second 9·3 parts of solid paraffin (within 7 per cent. of the total). This shows that the method is available for an approximate determination of solid paraffin, while it has the advantage that it can produce no alteration in the constituents. Whether it is equally well applicable to mixtures of soft paraffins and very viscid oils remains to be seen.

While all the fractions obtained from vaseline by distillation yielded, by this method, distinctly crystalline flakes of paraffin, *undistilled vaseline*, when treated in the same manner, showed no crystalline structure whatever in the separated portions.

Separation of Vaseline into a Solid and Liquid Portion.—The method just described was next employed by the authors to separate the solid portion of vaseline from the liquid. In order to reduce the number of operations, a little more alcohol was added to the first prepared ethereal solution, so as to produce a thin magma. The resulting filtrate was deprived of ether and alcohol, and the process was repeated only if it was not entirely liquid. The last precipitations were also made in a freezing mixture, and the first obtained precipitates redissolved and reprecipitated as stated above.

Working in this manner, the authors obtained from 100 parts of vaseline (derived from oil II., having a melting point of 30·31° C.), 40·8 parts of solid matter, which they designate as "solid vaseline" (to distinguish it from "solid paraffin"). This had a specific gravity of 0·8836 at 20° C., and the melting point 40° C. The rest constitutes the "liquid vaseline," had a specific gravity 0·8809, and began to congeal only at 10° C. The curious fact that the original vaseline has a lower specific gravity (0·8785) than either of its constituents thus separated by solvent is not without precedent, since Grotowsky* has shown that certain technical paraffin oils (mixtures of paraffin and oil) are lighter than their constituents.

SPECIFIC GRAVITY OF BEESWAX.†

Herr Dieterich has of late examined into the real specific gravity of beeswax, the different observers giving often widely varying figures. He found that this was due to the different ways in which the "floating" test in more or less diluted alcohol was conducted. The best dilutions are: 0·960, 0·961, 0·962, 0·964, 0·965, 0·966, 0·967.

There are three ways in which the test is applied:

1. A piece of wax is chipped off, cleaned as much as possible from all fragments, and allowed to float. The specific gravity of the diluted alcohol in which the wax floats in the middle (neither on the surface nor at the bottom) is the true specific gravity of the wax.

2. A piece of wax is kneaded in order to make it homogeneous and exclude all air, and allowed to float.

3. Hager's "pearl" method. Heat a piece of beeswax over a small alcohol flame till a drop of melted wax is formed, and allow it to fall into strong alcohol, keeping the wax as near over the surface as possible. Form in this way a dozen "pearls," put them on blotting paper, and let them dry at ordinary temperature for twenty-four hours (because recently made "pearls" are too bulky, and therefore give a too low specific gravity); then allow them to float in the diluted alcohol.

The following figures will show the difference in specific gravity according to the treatment of the same wax:—

Chipped piece.	0·963
Kneading one minute	0·957
Kneading five minutes	0·963
Recently made pearls	0·961
Pearls after twenty-four hours	0·964

Dieterich finds after several years' experience with very large quantities of beeswax that the specific gravity is between 0·963 and 0·966.

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* *Zeitsch. f. Berg-, Hütten- und Salinenwesen* (1876), 24, 42.

† From *Pharm. Zeitung.* Reprinted from the *Pharmaceutical Record*, February 15.

The Pharmaceutical Journal.

SATURDAY, MARCH 19, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

ANNUAL DINNER OF THE CHEMISTS' ASSISTANTS' ASSOCIATION.

THE annual dinner of the Chemists' Assistants' Association, which took place on Wednesday evening at the Holborn Restaurant, was again a very successful reunion, having been well attended by the members and their friends, while the number of visitors was larger than on previous occasions. The chair was taken by Mr. CARTEIGHE, and among the visitors were Drs. CURNOW and MACNAUGHTON JONES, Mr. GREENISH, Mr. BOTTLE, Mr. F. BARRON and Mr. H. B. SPINK. After the usual loyal toasts, Mr. T. S. DYMOND proposed the toast of "The Medical Profession," which was responded to by Dr. CURNOW, who took occasion to comment upon the necessity for the pharmacists' assistance of the medical practitioner, and to insist upon the desirability of relying upon pharmacists to perform that portion of the art of practical medicine which appertains to the preparation of medicines. He gave an amusing sketch of his own early experiences under conditions where this differentiation of functions was not observed, with the view of illustrating the disadvantages of the neglect of such a division of labour as he thought to be desirable both for the good of patients and for the convenience of medical men. It is a pleasant indication of progress to find this view is now pretty freely expressed on various occasions by medical men when opportunity offers, and Dr. CURNOW's genial exposition of it met with hearty appreciation from his hearers. The toast of "The Pharmaceutical Society," coupled with the name of the Chairman, was proposed by Mr. TAYLOR, in the unavoidable absence of Mr. BURNETT, to whom this duty was assigned in the programme, and Mr. CARTEIGHE in reply referred to some of the salient points in the history of the Society, for the purpose of showing that its aim and endeavour had always been to improve the position of pharmacists, and advance their interests individually and as a body. He pointed out that the original foundation of the Society by individuals of the highes reputation as pharmacists was specially characterized by a desire to benefit their colleagues in the trade, and the provision that was made by the Society in its early days for affording educational facilities to any one connected with the trade was a proof of the disinterested motives which led to its formation. The grant of a Royal Charter of incorporation was a public recognition of the soundness of the principle upon which the pioneers of pharmaceutical organization had acted, and although there were at that time, as well as at the present, scoffers at the Society among the ranks of those who belonged to the trade, it grew in prosperity and influence until at length, in the year 1852, the first Pharmacy Act was passed to give greater effect to the desire to promote a uniform system of educating those who practise pharmacy. Some ten years later a further attempt to obtain improvement in this respect was made by the Society, which resulted in the introduction of a Bill in Parliament providing for an educational qualification of all persons engaged in the business as pharmaceutical chemists, but this was frustrated by the evidence afforded that the members of the body of chemists and druggists were not agreed among themselves. The scoffers at the Society were responsible for this failure, and the Act that was subsequently passed in 1868 fell short of the aim of the Society in consequence of the want of internal agreement. It was contended by the opponents of the Society that there was no need of education, but that a licence to sell poisons was all that was necessary for the safety of the public and for the interests of those engaged in the business. Since that time the defects of this Act have become manifoldly apparent, and, again, the scoffers at the Society have charged it with the blame, though the defects of the Pharmacy Act of 1863 are in no way due to the Society, but to the internal opposition by which its objects were defeated. The experience gained under the operation of that Act showed that the candidates for qualification in accordance with its provisions, instead of being educated in the sciences connected with pharmacy, and trained in the practice of their art, presented themselves in the examination, specially prepared to disgorge a greater or less mass of information that had been obtained for the purpose of enabling them to pass the scrutiny of the examiners, but obtained in such a manner that it was difficult, if not impossible, for the examiners to decide whether it gave evidence of real knowledge or not. Such a state of things was a great disadvantage to the candidates, and the efforts of the Society to establish systematic education should be regarded as an indication of a generous desire to improve the conditions under which candidates seek to prepare themselves for obtaining legal qualification as pharmacists. That such a generous spirit had characterized the action of the Society throughout was evident in connection with the Benevolent Fund, which was in 1868 made available not only for members of the Society, but, generally, for every person registered under the Act. Similar evidence was furnished by the registration under the Act having been carried out by the Society without any charge

of such a fee as is usually insisted upon in such cases. On all of these grounds Mr. CARTEIGHE contended that the Society was entitled to the support of every one connected with the business, and he impressed this upon the consideration of his hearers, not only because as assistants now they might become principals to-morrow, but also because the future of pharmacy was a matter of especial interest to them. That the members of the Chemists' Assistants' Association had not lost sight of the importance of this fact and of the necessity of going forward in the work that the Society was formed to carry out was shown by the memorial addressed by that Association to the Council some time since urging the establishment of a satisfactory system of pharmaceutical education. The Council had taken in hand, upon that instigation, to go on in the work; it was going on with this work at the present moment, and speaking in the name of the Council and of the Society, he trusted to the Chemists' Assistants' Association to support the work.

Afterwards, in proposing the toast of "The Chemists' Assistants' Association," Mr. CARTEIGHE referred in complimentary terms to the excellent work that is being done by it, in common with other Associations of a similar nature, and he expressed his entire disbelief in the justice of those apprehensions that had been entertained in some instances, that the formation of associations among assistants might be productive of bad results rather than advantage. That he considered had been distinctly disproved. In speaking of the progress of the Association, as shown by the increase of members from 131 to 182 during the past year, by the increase in the number of patrons from 27 to 34, and by the prosperous state of the finances, he instanced the publication of an annual report of the proceedings as being a most commendable feature. Mr. MILLHOUSE, the President, in replying, referred to the improvement there had been in the attendance at the meetings of the Association, the average number being now forty-two, or twice as many as last year. The success of the last Conversazione had been so great as alone to make the Association a power in the pharmaceutical world, and he rejoiced to say that it was never more thoroughly in touch with the Society than at present.

The last toast was that of "The Visitors," and in proposing it Mr. R. WINFREY made a digression for the purpose of expressing the opinion that direct representation on the Council of the Society was an object the Association should endeavour to obtain. Mr. H. B. SPINK, in replying to this toast, thoroughly endorsed the view expressed by Mr. WINFREY, but added that he would not stop at that point in carrying out direct representation, for holding, as he did, the opinion that it was highly desirable and necessary that a body so large and important as the pharmacists of this country should have direct representation in Parliament, he looked forward to the time when this would become an accomplished fact. This closed the proceedings of a most agreeable evening, which was enlivened by an excellent musical programme, for the carrying out of which great credit is due to those who took part in it, and in every respect we think the Chemists' Assistants' Association may be congratulated upon having placed on its record another marked success.

On Thursday last the second reading of the Pharmacy Acts Amendment Bill was moved in the House of Lords. It was pointed out by his lordship that the object of the Bill—one of great importance to the general public—was to enable the Pharmaceutical Society to make adequate arrangements for an educational curriculum for students of pharmacy. After explaining the constitution of the Society and the powers which had been conferred upon it by Royal Charter and legal enactments, his lordship pointed out that it had been found the present requirement of mere examination had not had the effect of inducing candidates for qualification to devote themselves to acquiring that practical skill which is absolutely essential for the safety of the public, and that many insufficiently trained persons consequently present themselves to pass. The Privy Council, having felt unable to confirm the Bye-laws framed by the Society for removing this defect, because they were not within the scope of the statute, the present Bill had been introduced with the unanimous approval of the Council of the Pharmaceutical Society, and of the Lord President, subject to a slight technical amendment. The Bill was then read a second time.

* * *

Our readers will remember that at the last Council meeting the letter from Sir Frederick Abel in reference to the Imperial Institute was referred to a Committee to take such steps as might be deemed desirable for carrying out the request contained in it, and we understand it was decided that a circular letter should be addressed by the President to the members and associates of the Society, enclosing a copy of the letter Sir F. Abel had requested him to bring under their notice, together with an intimation that if they had not already subscribed to the Fund for establishing the Institute and proposed to do so, the President would receive any donations they might send, and transmit them with others to the Secretary of the Institute. Such donations would form a pharmaceutical contribution towards the establishment of the Institute, and it has been intimated by the Committee of the Institute that the smallest amounts will be gladly received and individually recorded. The circular letter above referred to was sent out last Wednesday.

* * *

At the annual meeting of the Aberdeen and North of Scotland Society of Chemists and Druggists it was decided to issue a circular calling attention to the present condition of the Society and suggesting to those who are not connected with it the desirability of becoming members. The annual subscription of a member is 10*s.* 6*d.*, and as the Society now possesses a really well-equipped laboratory, museum and library, it offers the use of these facilities for study to assistants and apprentices of members at reduced rates of subscription, the general aim being to promote good fellowship among members of the trade and the education of the younger branches. It has been suggested that the annual dinner of the Society should be held in Elgin, and that there should be a discussion of trade topics on that occasion.

* * *

We regret to report the death, on Sunday last, of Mrs. Annie Whitehead, who was elected an Annuitant from the Benevolent Fund in December, 1878.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The ninth meeting of the ninth session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, on the evening of Wednesday, February 23, at 9.15, Mr. William Duncan, President, in the chair.

The minutes of last meeting having been read and approved, the Chairman called upon Mr. George Lunan to read—

A Note on Commercial Hypophosphorous Acid.

BY GEORGE LUNAN.

Solution of hydrogen hypophosphite or hypophosphorous acid is not an official substance, but the inclusion of the calcic and sodic salts in the Pharmacopœia and the prominent place which it occupies in published formulæ for the preparation of compound syrups of the hypophosphites warrant its being included in the category of officinal preparations. The acid, although containing three hydrogen atoms in the molecule, is monobasic, only one of these being replaceable by metallic bases, and as a consequence the formula is always written HPH_2O_2 and not H_3PO_2.

It is the least oxygenated phosphorus acid, containing one atom less oxygen than phosphorous acid, and two less than phosphoric, in the molecule.

Proctor in 1858 recommended for its preparation the decomposition of 480 grams of the calcic salt by 350 grams of crystallized oxalic acid, making saturated solutions of each; mixing, filtering and evaporating the filtrate to eight and a half fluid ounces, when the solution would contain 10 per cent. of the acid.

In Parrish's 'Pharmacy' this formula is reproduced in detail, 350 grams or a sufficiency of crystallized oxalic acid being specified. Attfield, in his latest edition, says it "may be prepared by decomposing the calcium salt by oxalic acid, or, better, the pure barium salt with sulphuric acid."

Watts's 'Inorganic Chemistry' recommends the decomposition of the baric or calcic salts with sulphuric acid, and Watts's 'Dictionary of Chemistry,' the baric salt with sulphuric acid, or the plumbic salt with sulphydric acid.

It will thus be seen that there is a variety of methods for the preparation of hypophosphorous acid. Commercially, however, the method recommended originally by Proctor is the one, I think, in general use. At least, if any reliance can be placed on the result of the experiments about to be summarized, this would seem to be a logical conclusion, as both calcium and the oxalic radicle were proved to be present in every sample examined.

As the solution that suggested this note was evidently much stronger in acid than would result from its preparation by Proctor's formula, I resolved to obtain supplies from different sources, merely asking for hypophosphorous acid, without demanding a certain percentage, and in that way making comparisons, with regard to their strength and impurities, of which something had been foreshadowed by the original solution. In attempting to deal with these samples as types of the acid of commerce, I wish to preface the communication of the results by stating that I am well aware that there is such a thing as medicinal purity comparable to chemical. To be more explicit, that economic considerations are as worthy of practical application by manufacturing chemists as by others, and that it is unnecessary to free a commercial drug from a non-injurious impurity contained only in small quantity at the cost of doubling the price of manufacture.

Samples A and B were obtained from wholesale drug houses of first class repute.

C was prepared by myself, using 12·6 grams of pure recrystallized oxalic acid, and instead of 17 grams of calcic hypophosphite as the molecular weight would require ·5 gram more (so as to insure, if possible, the absence of oxalic acid in the resulting solution), dissolving separately, mixing, filtering, washing and evaporating the fluid until it weighed 132 grams, when it should have contained 10 per cent. of the acid.

D was a sample kindly furnished me by a retail pharmacist in town. The time at my disposal would not admit of an examination of more, but I believe the above are typical of the commercial article.

The tests to which each sample was subjected, were:—

1st. A solution of calcic acetate containing excess of acetic acid to detect oxalic acid or other oxalates.

2nd. A solution of ammonium oxalate to detect calcium salts.

3rd. A solution of plumbic acetate containing excess of acetic acid to detect phosphorous acid, or other phosphites.

I relied on the last test, from the fact stated in Watts's 'Dictionary of Chemistry,' that phosphite of lead is insoluble in acetic acid.

As these were likely impurities from the known methods of preparation, more attention was devoted to them than others.

In making qualitative estimations, the *modus operandi* consisted in adding to a small quantity of the sample the calcic acetate solution. In none of them was there an immediate precipitate, but on gently heating, or by merely stirring, a characteristic one began to appear in every sample more or less abundantly.

The ammonium oxalate reagent at once produced a precipitate in them all, and, as this seemed to indicate that the oxalic radicle was contained as calcium salt dissolved by the acid, each solution was neutralized by AmHO, and filtered from the precipitate, which formed in every case, care being taken to use a sufficiently diluted solution. The precipitate was examined, and found to consist of calcium oxalate in every case.

The filtrate was tested for the oxalic radicle in the usual way, and for calcium.

The oxalic radicle being absent, the filtrate was tested after an excess of acetic acid had been added by the acetate of lead reagent.

Of other impurities there were none likely and none found in sufficient quantity to warrant notice.

The results are tabulated below:—

Sample.	CaC_2O_4	Excess of oxalic acid.	Excess of $Ca_2PH_2O_2$	H_3PO_3
A .	Abundant	Absent	Abundantly present	Absent
B .	Present	Absent	Present	Trace
C .	Present	Absent	Abundantly present	Absent
D .	Present	Absent	Present	Absent

Comment or inference from these will be left over until the quantitative analyses have been stated. The specific gravities were taken at 60° F. The neutralizing power, not a very reliable test with a readily oxidized acid like hypophosphorus acid, was determined by a quarter normal solution of NaHO, using methyl orange as an indicator.

Ten c c. of the samples were diluted to 500 c.c. with distilled water. Ten c.c. of the ¼th NaHO standard solution, which would contain ·10 gram of NaHO equal to neutralizing ·165 gram of hypophosphorous acid, were taken, so that the quantity of the diluted sample required to neutralize this contained ·165 gram of the acid. In the case of sample A 25 c.c. of the 1 in 50 solution were required, which would be equal to ·5 c.c. of the original sample, the specific gravity of which was 1·1332, so that it would weigh ·5666 gram, and if that contained ·165 gram of acid a rule of three sum decided that the percentage was 29·12. In making these volumetric estimations the ordinary method, that of running the standard solution into the sample, was not followed, it being thought that having the more dilute solution in the burrette would give more exact results. Also that the in-

dicator would be altered by remaining for any length of time with an excess of so powerful a reducing acid as hypophosphorous.

Practically, however, both methods yielded similar or very nearly similar results.

As it was thought that the determination of the reducing power of the samples would be a truer criterion, a process easily applied was looked for.

A standardized solution of $KMnO_4$ would, it was thought, admirably suit the purpose.

Various experiments were then made in the acid solution and neutralized, but after a series of heart-burnings it was found that the process would not work practically.

Though there can be no doubt that the official hypophosphites can be readily and easily determined by this method it must be borne in mind that in these cases known quantities are operated upon, and the end of the reaction can be ascertained only by filtration. The idea of using $KMnO_4$ was therefore abandoned, and fortunately for me the resources of chemistry were not exhausted. In Watts's 'Dictionary of Chemistry' a process founded on the power of hypophosphorous acid of reducing $HgCl_2$ to HgCl was unearthed. It consists in adding a known quantity of the sample to an excess of mercuric chloride, acidifying with a small quantity of HCl, keeping the solution at a temperature of 60° C. for some time, then throwing on a tared and dried filter, washing, drying at 100° C., and weighing the calomel. The equation is $H_3PO_2 + 4\,HgCl_2 + 2\,H_2O = H_3PO_4 + 4\,HgCl + 4\,HCl$. It was specified in the process that the temperature must not exceed 60° C., as in that case some of the calomel might be reduced to the metallic state. Practically, however, it was found that barely one-half of the reducing power of the samples was exhausted by digestion for nearly an hour at 60° C. A quantity of the acid heated to 100° C. with excess of $HgCl_2$ produced a white precipitate which showed no signs of reduction, either to mercurous oxide or to metallic mercury, and as it was proved that the filtrate could be boiled indefinitely without producing the slightest further precipitation it was deemed that this process would work practically with the alteration of the digestion at 60° C. to heating to the boiling point 100° C.

As an example of this process 20 c.c. of a solution of sample (A) containing 10 c.c. in 500 c.c., which would be equal to ·4 c.c. of the original solution, weighing (seeing the specific gravity was 1·1332) ·45468 gram, was taken; to this was added a known excess of 5 per cent. solution of $HgCl_2$, 3 c.c. of HCl, and the whole diluted to about 100 c.c. with distilled water, and heated to 100° C.

The calomel separated as a lustrous purely white precipitate, which when thrown on a tared filter, well washed and dried, weighed 1·8989 gram.

Now by the equation 942 grams of calomel are produced by 66 grams of H_3PO_2, so that calculation proved that ·45328 gram of the sample contained ·133 gram of pure H_3PO_2 which is equal to 29·48 per cent.

The quantitative estimation is tabulated below :—

Sample.	Sp. gr.	Percentage of H_3PO_2 by NaHO estimation.	Percentage of H_3PO_2 by reduction of $HgCl_2$ to HgCl.
A.	1·1332	29·12	29·48
B.	1·1367	29·95	29·95
C.	1·0442	8·87	8·87
D.	1·0353	8·07	8·07

If any reliance can be placed on the qualitative estimations submitted to you, it would seem that the acid cannot be prepared free from calcic oxalate if the lime and oxalic acid process is used for its preparation.

As there cannot be any doubt but that freshly precipitated oxalate of calcium is to a certain extent soluble in hypophosphorous acid, for I verified this by an experiment, the question arises, "Is the presence of calcic oxalate likely to have any deleterious effects?" Supposing the sample to be required for the preparation of a compound syrup of the hyphosphites containing the calcium salt, it would lead to endless trouble to keep a presentable syrup. Even if it were contained as free oxalic acid it would be more easily got rid of (as it would be all thrown out at once) than by the slow process of precipitation which would go on for months, as in presence of a less acid solution the calcic oxalate slowly separated. If it were required for dispensing purposes it would when diluted gradually deposit its impurity. Again the quantity of impurity introduced into the system would amount to something considerable in time, were the medicine persisted in. In short, the acid is not likely to recommend itself as a mode of exhibiting the hypophosphorous radicle until the commercial article is to be obtained purer. I have never personally come across a sample of the commercial drug that did not deposit more or less after being kept for a week or two.

Mr. A. E. Robinson, in a paper read before the British Pharmaceutical Conference, in 1885, suggested the use of this acid as a preservative agent, for a concentrated solution of ferrous iodide, specifying that care must be taken that the acid should contain no oxalic acid. Then these samples, whether used as a preservative for ferrous iodide, bromide or chloride, would not do. It was thought likely that the more concentrated solution would give evidence of the presence of phosphorous acid, but this was not so, except in one case, and the volumetric and gravimetric estimations taken conjointly confirm this. The high specific gravity of sample C is due to excessive quantity of lime salt it contained. That the neutralizing power of the samples is lower than their reducing power is also borne out by the same fact. The only inquiry suggested by the quantitative estimations is, "Whether a 10 or 30 per cent. sample should be used when acid hypophosphorus is simply ordered?" The quantitative determinations proved one thing, however, which would otherwise have remained a matter of doubt, namely, that phosphorous acid was absent almost entirely from the samples.

This was contrary to my preformed judgment, having thought that at all events the more concentrated solutions would contain appreciable quantities. Had there been another week at my disposal before communicating these notes, I intended preparing a sample of the acid by the barium salt and sulphuric acid process, and submitting it to you with a recommendation. The process which I intended following was to decompose 29 5 grams of the pure barium salt, dissolved in 120 c.c. of distilled water, with 10 grams of H_2SO_4, specific gravity 1·843, filtering, washing to make the filtrate measure about 150 c.c., and concentrating until the fluid weighed 65 grams, when it should contain 20 per cent. H_3PO_2. As I am not certain whether the nascent acid may not render some of the barium sulphate soluble by reducing a quantity of that precipitate to sulphite, I cannot offer the process guaranteed.

Regarding the concentration I feel sure that an acid of 20 per cent. would be suitable for every purpose, and this cannot be said of the weaker, while at the same time it would not be rendered liable to the alteration which further condensation would produce.

I have only, in conclusion, to thank the firm of James Robertson and Co., 35, George Street, for placing samples at my disposal, and for allowing the use of their reagents and apparatus to conduct these experiments. I have particularly to thank Mr. A. A. Lumsden, who has most obligingly rendered me invaluable aid in conducting and verifying the quantitative estimations. Besides he has placed at my disposal his counsel and advice on the whole subject, and backed by his assistance as a technical analytical chemist of many years' experience, I am emboldened to submit these notes to your full and free criticism.

[Since reading the above Mr. Boa has drawn my attention to the fact that my results confirm to a considerable extent those arived at by Mr. Branson, whose published remarks I had not previously seen.]

The reading of the paper was followed by a discussion, and on the motion of the Chairman a very hearty vote of thanks was awarded to Mr. Lunan.

The President then read the following paper on—

Blaud's Pills.

Three months ago the query "What is the best method for making Blaud's Pills?" was put to me at one of the meetings of our Association, and knowing that great diversity of opinion exists among us as to the "best" method of preparing the same, I thought the subject a very suitable one for a short paper. Having procured in all nine samples of the pills, I estimated the amount of iron present in the ferrous state, calculating it as carbonate.

A	contained	. . . .	14·9	per cent.	$FeCO_3$
B	„	. . . .	14·25	„	„
C	„	. . . .	22·0	„	„
D	„	. . . .	19·49	„	„
E	„	. . . .	20·1	„	„
F	„	. . . .	15·4	„	„
G	„	. . . .	9·9	„	„
H	„	. . . .	14·5	„	„
I	„	. . . .	10·0	„	„

These samples, with the exception of G and I, were to all outward appearance passable pills, although some would have been greatly improved if a little more care had been taken in rounding them off with the pill finisher. G and I fell to powder when pressed between the fingers. C and E must have been made with dried sulphate of iron, as the theoretical percentage of $FeCO_3$ in a mass made with 50 per cent. $FeSO_4 7H_2O$, the usual strength, is only 20·8 per cent., providing no oxidation has taken place, a thing which is absolutely impossible if you attempt to form the ferrous carbonate in the mortar. Of course I am perfectly aware that many pharmacists believe the proper course to adopt in making Blaud's Pills is to hinder chemical action as much as possible, trusting to the reaction taking place in the stomach while the pill is being disintegrated; but I do not think that was the intention of the originator of these pills, neither do I think the majority of us follow out that idea in preparing them. We have no right to take for granted that $FeCO_3$ is formed in the stomach, while we all can see for ourselves that it is in the mortar. Inquiry at the various shops where I was supplied with specimens elicited the following amusing differences of opinion regarding their preparation. One gentleman tells me he dries separately the iron sulphate and potass. carbonate, mixes the iron with one-sixteenth of its weight of tragacanth, adds the potass. salt and beats into a mass with treacle. His intention is to prevent chemical action between the salts as much as possible.

Another dissolves 2 oz. $FeSO_4$ in hot water, and the same quantity of K_2CO_3, mixes the solutions and evaporates to dryness, making up to 4 oz. with equal weights of pulv. acaciæ and liquorice. They are then massed with glycerine and syrup. This process I believe yields the minimum of $FeCO_3$. Still the pills seem to be as good medicinally, and no fault has been found either by prescribers or patients. As a matter of fact, Mr. Hill tells me he has known of pills which contained not a trace of ferrous iron and yet were said to act as rapidly on the system as the others. Another gentlemen takes 1½ oz. of dried $FeSO_4$ and the same quantity of K_2CO_3, mixes them, adding 1 oz. pulv. acaciæ, and beats into a mass with simple syrup, cutting into four-grain pills. After standing for some time to harden, he varnishes them with solution of tolu in ether. They are certainly beautiful pills to all outward appearance, but here again he believes the stomach to be the proper place for the chemical reaction between the salts, not the mortar. He has great faith in his own method, and tells me that a customer of his who had gone to the south of England asked her chemist there to send to Edinburgh for A.'s compressed Blaud's Pills. Others either made them by Martindale's or Ince's formula; two I think by simply rubbing the two salts together, and adding tragacanth q.s. to the liquid mass to give it a proper consistency.

Wishing to test the keeping properties of pills made by the methods followed, I made two dozen each from Mr. Ince's formula, Mr. Martindale's and the old way above described. All were made the same night, and estimated with $K_2Cr_2O_7$, using sulphuric acid as a solvent, and checking the results by duplicate estimations, using H_3PO_4 as a solvent to avoid the action of the sugar influencing the conversion of the ferrous to ferric salt. As a matter of fact, the difference between the four estimations was very slight (two with H_2SO_4 and two with H_3PO_4). The following is Mr. Ince's method.:—

℞ 1	Ferric sulph.	℥ss.
	Glycerine (hydrated)	♏iij.
2	Potass. carb..	℥ss.
	Glycerine.	♏ij.

Mix 1 and 2 separately on a slab with glycerine, then mix together in the mortar, add p. tragacanth, gr. vj, and divide into twelve pills. In this formula the K_2CO_3 is very much in excess of what is actually necessary for the conversion of the $FeSO_4$ into $FeCO_3$, the 30 grams $FeSO_4 7H_2O$ requiring only 16 grains of anhydrous K_2CO_3, equal to about 20 grains of the B.P. salt, which contains 16 per cent. H_2O. Mr. Martindale says that a pill made with equal quantities of the two salts will be sure to deliquesce, and in the 'Extra Pharmacopœia' recommends the following improved formula :—

℞	Ferri sulph..	2½ grs.
	Potass. carb.	1½ grs.
	Sacchar..	1 gr.
	Pulv. trag.	⅙ gr.

I also made two dozen by Martindale's formula, but used a little glycerine to rub up the salts, as in Ince's.

The following are the percentages of $FeCO_3$ in the fresh pills :—

	$FeCO_3$ per cent.
No. 1 (Ince's formula)	17·9
„ 2 (Martindale's)	17·0
„ 3 (Martindale's formula, but Ince's mod.)	19·5
„ 4 (with tragacanth only)	16·5

These four sets were laid aside in ordinary chip boxes for two months, the boxes during that time being occasionally opened. They were then carefully examined and estimated. No. 1 (Ince's) were quite hard, and seemed as good as the day they were made.

No. 2 (Martindale's) were very slightly marked with damp looking patches, the pill powder (pulv. amylic. 5 per cent. trag.) being slightly caked on them.

No. 3 were very soft, and altogether unsightly from absorption of moisture, although the glycerine used in them was hydrated, as recommended as not being hygroscopic.

No. 4 were quite dry and round, but fell to powder when pressed between the fingers.

On being estimated,

No. 1	contained	. . .	13·73	per cent.	$FeCO_3$
„ 2	„	. . .	18·3	„	„
„ 3	„	. . .	18·8	„	„
„ 4	„	. . .	11·7	„	„

One pharmacist tells me he had the same difficulty with the pills made from Martindale's formula, namely, sweating, and suggested sugar of milk to be used in place of cane sugar. This, I find, is an improvement only in appearance, for on estimating pills in which the same quantity of iron was used to begin with, and which had been kept a month, I found that they only contained 12·2 per cent. $FeCO_3$.

From these experiments I have come to the conclusion that Martindale's formula is the one that should be adopted by those of us who believe Blaud's pills should be really a preparation of $FeCO_3$, and not a preparation of $FeSO_4$, intended to form the carbonate in the stomach under the assumption that the same reaction goes on in that place as in a glass measure. Their tendency to sweat would be overcome, I think, by varnishing them in tolu and ether, although I have not had time to test the value of that suggestion. Is not this a subject suitable for the B.P.C. Formulary Committee to take under their consideration, and give us an official formula, if not a B.P. one?

The paper gave rise to a good deal of discussion, and on the motion of Mr. Turnbull, seconded by Mr. Henry, a unanimous vote of thanks was awarded to Mr. Duncan.

Mr. George Coull then gave a practical demonstration of the process of volumetric estimation, which was evidently highly appreciated by the members.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The ordinary monthly meeting of the Sheffield Pharmaceutical and Chemical Society was held in the Society's room on Wednesday night, Mr. Newsholme, President, in the chair.

Mr. G. A. Cubley read a paper on "The Weights, Measures, and Arithmetic of the Pharmacopœia."

The paper was listened to with great interest throughout, and, on the motion of Mr. Newsholme, seconded by Mr. Grierson, a vote of thanks was passed to the lecturer.

TORQUAY CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at Wood's Temperance Hotel on Tuesday, the 8th inst., Mr. J. Horton in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. Chas. Shapley delivered a lecture on "Pharmaceutical Zoology."

The lecture, which treated mainly of the principal products and educts of the Pharmacopœia, was of exceeding interest, and was listened to with great attention throughout. It was illustrated by a number of specimens kindly lent by the Museum Committee of the Pharmaceutical Council.

At its close a vote of thanks, moved by Mr. F. March and seconded by Mr. Curtis, was spoken to by Messrs. Colebank and E. H. Farr.

It was announced that the papers for Mr. E. Smith's prize on "Pill-making and Pill-coating" would be received from members not later than March 31.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At a meeting of the Chemical Society on Thursday, March 3, Dr. Hugo Müller, F.R.S., President, in the chair, several certificates were read for the first time, and the following were elected Fellows of the Society:—

Messrs. C. H. Cribb, L. Dobbin, J. F. Geisler, E. Hall, A. Hay, T. A. Hedley, J. S. Jackson, G. McGowan, G. T. Moody, J. W. O'Connor, H. D. Richmond, A. H. F. Ruppel, W. Scrutton, H. L. Snape, A. Stanley, H. Wallis.

The following papers were read:—

Tartaric and Racemic Acids and the Magnetic Rotatory Power of their Ethyl Salts. By W. H. Perkin, Ph.D., F.R.S.—The author has very carefully determined and compared certain physical properties of the diethylic salts of ordinary tartaric and racemic acids, prepared by the usual method by saturating the alcoholic solution of the acid with hydrogen chloride. Both boil at 232°–233° (corr.) under a pressure of 197 mm. They have the same relative density, viz.:—

Diethylic tartrate $d\frac{15^\circ}{15^\circ}=1{\cdot}20972$ $d\frac{25^\circ}{25^\circ}=1{\cdot}20189$.

Diethylic racemate $d\frac{15^\circ}{15^\circ}=1{\cdot}20983$ $d\frac{25^\circ}{25^\circ}=1{\cdot}20214$.

They have also the same mean molecular magnetic rotatory power, viz.:—

Diethylic tartrate at 14·8° = 8·766
Diethylic racemate at 15·5° = 8·759

It may therefore be concluded that the racemate is a mixture of the two tartrates. Racemic is distinguished from tartaric acid by crystallizing with 1 mol. proportion of water; the author finds that silver racemate, like the tartrate, is anhydrous. In preparing silver tartrate he obtained an acid salt, $C_4H_5AgO_6.H_2O$, crystallizing in well-defined monoclinic prisms, measurements of which by Professor Haushofer are given. An acid silver racemate appears also to exist, but is much less soluble than the tartrate, and the crystals are small. The relative densities of aqueous solutions of the two acids were determined, using (*a*) a solution containing 8·333 per cent., and (*b*) a solution containing 25 per cent., the latter being supersaturated in the case of racemic acid; the results are—

Tartaric acid solution $d^{(a)}\frac{15^\circ}{15^\circ}=1{\cdot}03703$ $d^{(b)}\frac{15{\cdot}3^\circ}{15^\circ}=1{\cdot}12346$.

Racemic acid solution $d\frac{15^\circ}{15^\circ}=1{\cdot}03712$ $d\frac{15{\cdot}3^\circ}{15^\circ}=1{\cdot}2398$.

The relative densities of the solid acids were also determined:—

Racemic acid, $C_4H_6O_6.H_2O$ . . $d\frac{7^\circ}{4^\circ}=1{\cdot}6873$.
„ dehydrated . . . = 1·7782.
Tartaric acid . . . . . = 1·7594.

These results, the author considers, point to the conclusion that on dissolving in water racemic acid separates into the two tartaric acids, only a small quantity remaining unchanged. He is of opinion that the water is present in crystallized racemic acid as such; and he finds that if the hydrated acid be crystallized from absolute alcohol, well-defined anhydrous crystals are obtained much less soluble than tartaric acid in alcohol.

Anhydracetonebenzil. By Francis R. Japp, F.R.S., and Cosmo Innes Burton, B.Sc.

Condensation Compounds of Benzil with Ketones.—By Francis R. Japp, F.R.S., and Cosmo Innes Burton, B.Sc.

Constitution of Glycosine.—By Francis R. Japp, F.R.S., and E. Cleminshaw, M.A.

Diphenylglyoxaline and Methyldiphenylglyoxaline.—By Francis R. Japp, F.R.S.

Dehydracetic Acid.—By W. H. Perkin, jun., Ph.D.

The Colouring Matter of Drosera Whittakeri.—By Professor E. H. Rennie, M.A., D.Sc.—The author's attention was drawn by Professor Tate to the presence of a red colouring matter in the tubers of the above-mentioned Drosera, which grows plentifully on the hills near Adelaide, South Australia. On inquiry he ascertained that Mr. Francis, of Adelaide, had extracted the colouring matter by means of carbon bisulphide, and had found that it was volatile, and that beautiful tints could be produced with it on silk by means of various mordants, but had not continued the investigation. To separate the colouring matter, the tubers were heated with hot strong alcohol. After distilling off the spirit, a little water was added and the precipitated colouring matter was then dried and sublimed; the product was a mixture of two substances differing in solubility in boiling alcohol and acetic acid. The less soluble was obtained in small brilliant red plates, canoe-shaped under the microscope

which melted at 192°–193°. Analysis gave numbers fairly agreeing with those required by the formula $C_{11}H_8O_5$, which may represent a *trihydroxy-methylnaphthaquinone*. The reactions of the substance, in so far as they could be studied with the small quantity of material at disposal, serve to support the view that it is thus constituted. The second substance was finally obtained in needles, quite different in appearance from the red plates, though to the eye of much the same colour. Under the microscope single crystals seemed yellow, but wherever they overlapped the colour appeared deep orange to red. It fused at 164°–165°. Analysis gave numbers fairly agreeing with the formula $C_{11}H_8O_4$.

Further Notes on the Di-haloid Derivatives of Thiocarbamide. By GEORGE MCGOWAN, Ph.D.

Parliamentary and Law Proceedings.

PHARMACY ACTS AMENDMENT BILL.

HOUSE OF LORDS.

Thursday, March 17.

The Earl of Milltown, in rising to move the second reading of this Bill in the House of Lords on Thursday, said: This is a short Bill, the object of which is extremely simple, but one of great importance to the general public. The Bill is to enable the Pharmaceutical Society of Great Britain to make adequate arrangements for the educational curriculum of those who are to be enrolled in the body. The matter is one of great public importance. The Pharmaceutical Society was founded in 1841; it received a Charter in 1843 for the purpose of promoting a uniform scheme of education in chemistry and pharmacy. The Pharmacy Act of 1852 confirmed the Charter, and made it penal for any unauthorised person to assume the title of pharmaceutical chemist. But the Act of 1868 went a little further. That Act made it unlawful for any person not duly qualified to sell or to dispense poisons, or to assume the title of chemist or druggist, the latter title being then for the first time introduced. There were certain poisons scheduled to that Act, some of which were of a more deadly character than others which are sold, and power was given to the Society from time to time, with the consent of the Privy Council, to add to the schedule. The Society consists of members, associates and registered apprentices—each class having a separate qualification, and having passed a separate examination. The apprentices were intended to pass a Preliminary examination before admission, and after a three years' apprenticeship to pass the qualifying examination. It has been found, however, that, owing to the extensive prevalence of the system of cramming which now prevails, persons in the position of apprentices present themselves to pass the qualifying examination without previously devoting themselves to acquiring that practical skill which is absolutely essential to the safety of the public. The sixth clause of the Act of 1868 apparently makes it imperative on the part of the examiners to pass any person who presents himself for examination, and who succeeds in passing the examination. The words of the clause are: "they are legally empowered and required to examine all such persons as shall tender themselves for examination under the provisions of the Act." That being so the Council of the Pharmaceutical Society has found it necessary to institute such qualifying examinations as is deemed essential for the safety of the public. The Society accordingly framed a bye-law for remedying this defect and establishing what it considered a sufficient curriculum of study, but the Privy Council to whom the bye-law was submitted felt themselves unable to confirm it, as they were of opinion that the statute did not enable them to confirm such bye-law. In consequence of that opinion this Bill has been introduced. It has the unanimous approval of the Council of the Pharmaceutical Society, and my noble friend the Lord President (Lord Cranbrook), subject to a slight amendment which he proposes to make in the phraseology of one clause, has no objection to the Bill. That is the effect of the Bill. The second clause gives power to the Committee in the case of persons who have acquired sufficient technical knowledge in certain parts of the empire to dispense with the three years' curriculum, but not with the qualifying examination.

The Bill was then read a second time.

PROSECUTION FOR INACCURATE DISPENSING AT A "DISPENSARY."

At the Westminster Police Court, on Wednesday, Ernest Farndon, of 256, Kensal Road, Kensal New Town, proprietor of a "Dispensary," was summoned at the instance of the Vestry of Chelsea for dispensing a prescription not compounded of ingredients in accordance with the demand of the purchaser, in this instance Mr. Michael C. Meaby, an officer of the Vestry.

Mr. C. Pemberton, who prosecuted for the parish, said that Dr. Seaton, the analyst, had found that many prescriptions were inaccurately dispensed, and this very much detracted from the value of the medicine.

Mr. Meaby proved that he left a prescription at the defendant's shop which was for 60 grains of sulphate of quinine in water, a tablespoonful to be taken twice a day. The analyst certified that only 13 grains of sulphate of quinine were put in the bottle.

The defendant said that his son told Mr. Meaby that he could not guarantee the quantity of the drug, as his weights were away to be verified.

Mr. Meaby stated that something equivalent to this was said after it was made known that the medicine was for analysis.

The defendant said he was not in the habit of dispensing other doctors' prescriptions. It was usual to charge at the rate of 1*d.* a grain for quinine, and in a practice of sixteen years he had never had occasion to put anything like 60 grains in one bottle of medicine. It was notorious that dispensers were in the habit of curtailing the doses prescribed by physicians every day in the week, and that if they did not so curtail them hundreds of persons would be poisoned. He did not think there was any law compelling a dispenser to dispense any quantity of a drug given in the prescription. In fact, they were told by the Pharmaceutical Society to use their own discretion if they noticed that a drug was ordered in excessive doses.

Mr. d'Eyncourt said it stood to reason that it would be foolish to make up fatal doses of any drug. The chemist would see that a mistake had been made. Did the defendant say this prescription would be fatal or injurious?

The defendant said quinine was usually prescribed in grain doses, and the prescription pointed to excessive doses. It was not exactly dangerous, but more than 1*s.*, the price paid by Mr. Meaby, must have been charged had 60 grains been used. Nothing of the kind had occurred before.

Mr. Pemberton said he could not let this statement pass unchallenged; other medicines had been found not to accord with the prescription. He thought it was more a case of carelessness than one of gain.

Mr. d'Eyncourt said it was all important that prescriptions should be accurately made up, and fined the defendant 40*s.* and the costs.

The defendant asked if he could appeal.

Mr. d'Eyncourt said no; it was a question of fact and not of law.—*Times.*

Reviews.

YEAR-BOOK OF PHARMACY: comprising Abstracts of Papers relating to Pharmacy, Materia Medica and Chemistry contributed to British and Foreign Journals from July 1, 1885, to June 30, 1886. With the TRANSACTIONS OF THE BRITISH PHARMACEUTICAL CONFERENCE at the Twenty-third Annual Meeting, held at Birmingham, September, 1886.*

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION at the Thirty-fourth Annual Meeting, held at Providence, R.I., September, 1886. Also the Constitution, By-laws and Roll of Members.†

These two volumes, which were received almost simultaneously, may be referred to together as representing analogous societies in Great Britain and the United States, consisting as each does mainly of a report of the proceedings at the annual meeting of the respective society and a *résumé* of a year's pharmaceutical literature. But, as might be expected, the volumes present differences of arrangement. In the American volume the papers read at the annual meeting, instead of appearing in the order in which they were read, each followed by the report of the discussion to which it gave rise, are arranged in three groups, twelve being classed under the heading "Pharmacy," six under "Chemistry," and six under "Materia Medica," whilst the reports of the discussions are interspersed among the "Minutes," which are somewhat more discursive than the members of the British Conference are accustomed to. Another feature of difference is found in the reports presented annually to the American Association, such as those on the Drug Market and on Legislation. From the latter it appears that during the previous year in one State, Virginia, a Pharmacy Act had been passed for the first time; in Iowa, New Jersey, King's County and Erie County, N.Y., amendments of previously existing Acts had been made; and in the States of Florida, Georgia, Kentucky, New York, Ohio and Virginia laws had been passed requiring the labelling of morphine with scarlet labels bearing white lettering. But the most interesting of these reports in the current volume, in view of the appointment of a Committee for a similar purpose in this country, is the "Report of the Committee on National Formulary." This consists of a preliminary draft of a national formulary of unofficial preparations, consisting of 414 formulæ. As divergent opinions have been expressed in this country respecting the preparations to be included in the Unofficial Formulary contemplated by the Conference, it may be useful to quote the proposition as to the "scope of the national formulary" made by the United States Committee and adopted by the members, which runs as follows:—"The National Formulary to be published under the authority of the American Pharmaceutical Association may contain the formulas of such preparations as have either been official in the U.S.P., and have been discarded, though still in demand; or such as have never been official, but deserve recognition, because more or less generally in use. Among the latter may be any preparations contained in foreign pharmacopœias, if there is known to be a sufficient demand for them in any section of this country. It shall also contain the preparations belonging to so-called 'elegant pharmacy,' but it shall not be encumbered with purely technical, trivial or fancy preparations."

In each volume a considerable space is taken up with the usual *résumé* of a year's literary contributions to pharmacy and the allied sciences. The British Year-Book, according to a statement in the Introduction, contains a larger number of abstracts than any of its predecessors; but in this respect it is still exceeded by the American volume, which is also its superior as to classification and arrangement of the abstracts. In the choice of materials and the work of condensation the two editors have shown their usual ability, though not without slips, as, for instance, where Mr. Siebold, on p. 51, makes an unfortunate author say that "cocaine hydrochloride is only slightly soluble in water." Few persons, however, have any idea of the labour involved in searching for grains of wheat among the enormous mass of chaff that now does duty for pharmaceutical literature. Nevertheless, both editors seem to have been actuated by a very catholic spirit in making their selections, though from the nature of things some hunting grounds have proved more productive than others. For it cannot be denied that a large proportion of the matter appearing in many English and foreign journals is essentially of an ephemeral character, and this is hardly to be considered subject for reproach, as it was never intended to be otherwise. Indeed, these year-books and analogous volumes may not unfairly be regarded as presenting evidence of the opinion of skilled and impartial critics upon the relative permanent value of the various journals that pass through their hands. Tried by this test the conductors of the *Pharmaceutical Journal* have no reason to be dissatisfied. It might be assumed, as a matter of course, that the British Year-Book must contain a large number of references to its pages, but perhaps not all would be prepared to learn that the United States Report contains nearly three times as many.

* London: J. and A. Churchill. 1886. Demy 8vo. Pp. i.-xii., 1-606.

† Philadelphia: American Pharmaceutical Association. 1886. 8vo. Pp. i.-xx., 1-753.

Obituary.

Notice has been received of the death of the following:—

On the 8th of March, Mr. George Dunger, Chemist and Druggist, St. Stephen's Street, Norwich. Aged 52 years.

On the 9th of March, Mr. Samuel Wyatt, Chemist and Druggist, late of Tottenham. Aged 62 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

SIR JOHN LUBBOCK'S BILL.

Sir,—Will you permit me to say, in reply to your editorial, that the meeting of the Manchester Pharmaceutical Association, referred to by Mr. Woolley at the last Council meeting, was a fairly representative one. It was composed of members of the trade from most districts of Manchester, city and suburban, and certainly included some of what Mr. Hart calls the "working class."

Although several, myself amongst them, raised some objections to the Bill on broad and general grounds, the feeling of the meeting was decidedly in its favour. We were much fewer than a hundred, so the calculation that at least ninety-nine per cent. of us belonged to the "aristocratic" early closing section of the trade necessitates the humiliating conclusion that one of us, at least, is regarded as a mere vulgar fraction. Messrs. Lewis, the drug-dealing tailors, were not represented, or Mr. Hart's arithmetic might have been explained without adopting this painful view of the case. Mr. Hart was not present at the meeting, and I am unaware of the means he has taken to ascertain the opinions of other absentees on whose behalf he appears to have addressed you.

F. BADEN BENGER.

Hon. Sec. Manchester Pharmaceutical Association.

Sir John Lubbock's Bill.

Sir,—Referring to your article, *re* Sir J. Lubbock's Bill, in the Journal, March 12, I am sorry to have to deny the accuracy of my neighbour's statements, but Mr. Hart, in saying that "the meeting was composed to the extent of 99 per cent. of the aristocratic element of the trade who already close at 7 or 8 p.m.," invites denial.

I do not claim to be included in our trade "aristocracy," but as I was present at the meeting in question, and am one of those who, whilst preferring a Bill without exemptions, yet gladly support this effort towards our emanci pation, I unhesitatingly aver that more than half of those present do not close at either 7 or 8 o'clock; and further, that the more aristocratic representatives of the trade—those whose present early closing would not be affected by the Bill—were the only ones who hesitated to endorse the Bill, or who raised any argument against it. It is worth recording, too, that so far as my knowledge goes, one of the most energetic opponents of the Bill which we have in our Association is a scion of a specially aristocratic house on which Royalty once benignly smiled and left its blessing.

The other remark, anent the reason for opponents taking no action against the Bill, hardly coincides with the fact that Mr. Hart, who claims to speak on behalf of the "working class" opponents, was the first to suggest the discussion, and it was he who promised to open the subject. If it did not receive its due treatment I suppose it was owing to the absence of "the opposition," and the blame, if any, rests with Mr. Hart, who should have attended, but did not, to put their view of the question before us.

254, *Stretford Road, Manchester.* H. Kemp.

The Future of Pharmacy.

Sir,—It is with extreme reluctance I again reply to the "Sheffield Student," Mr. Humphrey. I take this opportunity to thank him for the advice he has been pleased to bestow upon me. I assure you, Sir, I feel the weightiness of it, coming, as it does, from one whose experience amounts, in all, to a few years more than my own.

How crestfallen part of "the younger members" must feel on being told by the self-appointed monitor that they are not capable of considering certain matters pharmaceutical—when, probably, some of them can boast of experience as wide, and perhaps more comprehensive than Mr. Humphrey himself.

What an acute perception he must have to fancy he can see a "Wardian" tone in my former letter, which it positively does not possess. I would modestly tell him he has erred in the conclusion arrived at (in spite of all his assumed knowledge concerning Mr. Ward), for my worthy employer never saw a line of the letter until his perusal in the Journal.

Mr. Humphrey charging me with making "rash statements," and coming to "startling conclusions," also saying that "vigorous definitions" and "careful analysis" seem quite beneath my ideas, is tantamount to "Satan reproving sin."

To make a long story short, I am still of opinion that recognized trade standards are desirable for medicinal preparations; also that the Pharmaceutical Society has, for one of its functions, the "care of the public safety," and maintain Mr. Humphrey, in his verbose communication, has adduced no material evidence to the contrary.

T. Lowe Hollely,
Student at the Sheffield School of Pharmacy.

[*** We think the foregoing letter sufficient evidence that the correspondence need not be carried any further.—Ed. Ph. J.]

Sir,—There are many subjects of pharmaceutical politics that are worthy the serious attention of those who take more than a passing interest in their own business world.

The decision in the Edinburgh case will, if followed up by the Council, be of incalculable benefit to the trade. If "Salus populi" be the reigning feature in the Pharmacy Act, then let us have no branch shops in the charge of porters and apprentices; compel every man who has a branch shop to place a duly qualified assistant and strike a blow at the numerous bogus partnerships which, under one disguise or another, exist in every large town; and thus do away with another of the many anomalies that exist under the Act.

The proposed education clauses must enlist the sympathies of those who wish to raise the trade from its unsatisfactory condition, and rescue our young men from the clutches of those parasites who profess to impart the maximum of knowledge in the minimum of time, who eternally ruin the pharmacist of the future, and make the future of the pharmacy as black as Hades. A few years of an enforced curriculum would give us a far better and higher class of men, men who would have an "ésprit de corps" far higher and holier than that manufactured for them in the cramming shops that are so undermining the status of the trade of to-day.

The appeal of the Council on behalf of the Benevolent Fund will have little or no permanent effect, unless backed up vigorously and systematically by our local secretaries. The great curse, both of the Society and the Trade Association, has been hitherto the supineness of local representatives. There must, if vitality is to be of any use to either society, be increased and continued exertion on the part of those who represent them in various centres; without this we shall go on in the same humdrum style. Spasmodic efforts will occasionally be made; the inevitable reactions will invariably follow, and the latter stage will be worse than the former. To those who are continually finding fault with the Council or the Executive of the Trade Association, I would say qualify yourselves by becoming members; exercise your voting powers; elect fresh local secretaries, and fresh councillors, who will carry out your ideas; do not stand outside cursing everybody; come in, turn them out and put in men who will carry out your ideas; but if you fail to do this, if you neglect your very simple duties, then at least leave those who have chosen to do the work you neglect to carry out the ideas of those members who have elected them, and do not act upon the childish and idiotic plan of I will not, therefore you shall not.

131, *Emden Street, Manchester.* J. Hart.

The Benevolent Fund: A Suggestion.

Sir,—I think someone has proposed that a "Jubilee Benevolent Fund" should be started as a temporary appendage to the ordinary Benevolent Fund, but I have not seen that this proposal has been seconded. If not, I beg to second it; and further to introduce a way of raising this Jubilee Fund, which perhaps may commend itself to some of your readers.

Before long most of us will be asked to contribute to a fund for commemorating the Jubilee of Queen Victoria. Some of us have already settled it in our own minds what we intend to give, but most of us are in doubt as to how the money collected is to be expended. Beyond all question some of the plans of commemoration decided upon will not exactly meet our views; some of us may think that money thus raised might be better expended than upon plays and fireworks. Let each of us then, where the object proposed is not in accordance with our wishes, subscribe only a part of the sum we at first intended, and send the rest to the Benevolent Fund of the Pharmaceutical Society of Great Britain. Divide the intended subscriptions; let part go, by all means, to local purposes, but send the rest to Bloomsbury Square for the benefit of the old and infirm among us, those who know nothing of "fifty years of prosperity."

We, as a class, have only ourselves to depend upon; external help there is none. We serve the public for the smallest possible pay, often for no pay at all. Where is there another body of men whose self-denying services are so wretchedly paid for? Well and good, we wish for no alteration; to be thrown upon one's own resources is perhaps best for all of us. But we must, this being the case, look upon these services so slightly remunerated as our contribution to the commonweal; and in justice to ourselves, whatever else we may have to contribute should take the form of cash, and be transmitted, for the benefit of ourselves and our class, to the Benevolent Fund.

I think it possible that a considerable sum may be obtained this Jubilee year in this way; it is also possible that chemists living in small towns or villages, where no Jubilee Commemoration is to be brought about, might consider the present a fitting occasion for giving to the Pharmaceutical Benevolent Fund. Supposing only a

thousand pounds were thus specially subscribed and used for temporary purposes, there are at least a hundred "past" chemists to whom a ten-pound note each would be very acceptable.

Cambridge. H. J. CHURCH.

DISPENSING OF TEREBENE AND TOLU.

Sir,—The dispensing note by Mr. Bisset on Terebene and Tolu, published in last week's Journal, is, I think, calculated to mislead the younger readers of the Journal with regard to the best method of making an emulsion with such bodies, and I must confess that I am somewhat surprised not to find any comment made upon it at the time by the members of the Association present.

The suspension of terebene by mucilage of tragacanth is most unsatisfactory; from such a mixture, diluted with water, the terebene separates in oily drops in a very few hours, showing that it has not been emulsified, however diligently it may have been rubbed. An ounce of mucilage of acacia is also largely in excess of the quantity required to emulsify the tinct. tolu. Two drachms of powdered acacia is the only addition required, and this is in excess of what is absolutely necessary. The mixture should be dispensed as follows:—Make a mucilage with the powdered acacia and six drachms of peppermint water in a mortar; of this reserve two drachms; with the four drachms in the mortar rub the terebene until emulsified, and dilute with two ounces of peppermint water. Dilute the reserved two drachms of mucilage with peppermint water, transfer to a bottle, and with this emulsify the tincture of tolu; to this add the terebene emulsion and finally the other ingredients.

T. A. W. SEWELL.

20, *New Street, Dorset Square, N. W.*

LINIMENTUM TEREBINTHINÆ AND SAPO MOLLIS.

Sir,—My stock of linimentum terebinthinæ, although thick and fairly satisfactory, having slightly separated, and having noticed the letters in your Journal on the subject, I determined that one of my assistants and myself should each make an experimental quantity (about 2½ ounces) with another sample of soap. In this we both failed, as my sample at the Pharmaceutical Evening Meeting showed; a thin mobile (not limpid) uniformly opaque liquid was produced. After Dr. Redwood's reply in defence of the preparation, I sent him a sample of the soap I had used, which he assured me would, if well manipulated, produce a satisfactory preparation. I therefore tried again, and have, even with the same pestle and mortar that I used before, and the same quantities of the same ingredients, succeeded in producing a good opalescent thick emulsion. We have also tried various samples of oil of turpentine—American, Russian, French and one rectified, all of which may be used officially—and have succeeded with all. We likewise tried various samples of soap (some kindly sent by Mr. Umney, one made from cotton seed oil), with all of which we have produced good results. It is, I confess, as Dr. Redwood says, chiefly a question of manipulation.

Very small quantities are not easily made, and if a larger pestle be used than has been made to fit the mortar, better and quicker results are obtained. Careful attention to the mixing of the soap and water and the perfect blending of these with the first additions of oil and camphor are points of importance. The trituration required is not the same as in a copaiba or castor oil emulsion; the movement of the pestle should be quick, but it should not be allowed so wide a play as in making the latter emulsions.

I still think that as the preparation is liable to variations according to its age, even if well made in the first instance, that by using rectified spirit in place of water, and producing a homogeneous transparent liniment, a more satisfactory preparation in every way is obtained.

Regarding the colour of the official soft soap in commerce, I have always found it have a greenish translucent hue when fresh; it soon assumes a "figgy" appearance, and eventually when old it absorbs moisture, and becomes a dirty opaque yellow colour. I, however, wrote to the manufacturers, Messrs. D. and W. Gibbs, who supply me, and requested to know "whether the yellowish-green colour which the soap usually has as met with in commerce, and as described by the Pharmacopœia, is a natural colour due to the colour of the olive oil used in making it, or is it produced artificially by some colouring matter being added." They replied:—"As far as we know colour has very little to do with olive oil being genuine or not, as olive oils are to be met with of various shades. We ourselves always buy the olive oil guaranteed genuine, and if any adulteration has taken place it is not in this country, and we certainly never use colouring matter. The reason of its green shade is the recommendation of the B.P. to that effect, which has caused us to select green oils, but if considered safer of course we can return to the old style of salad oil, which is much 'paler in colour.'"

10, *New Cavendish Street.* WM. MARTINDALE.

LAUDANUM AND NEPENTHES.

Sir,—In looking through an old book, 'Pharmacopœia Londinensis Collegarum, 1651,' at page 229 I find, amongst the pill masses, formulæ given for both laudanum and nepenthes. As possibly they may be interesting to some of your readers, I send them exactly copied from the original.

Laudanum.

℞ Opii Thebaici extracti in Sp.
Vini . . . . . unciam unam.
Croci similiter extracti . . . drach. unam semis.
Castorei . . . . . drach. unam.

Excipiantur tinctura semunciæ Spec. Diambræ recentium in spiritu Vini facta. Mox adde—

Ambræ griseæ,
Moschi . . . . . ana grana sex.
Olei Nucis Moschatæ . . . . guttas decem.

Deinde, evaporatione facta ad tepidum Balnei calorem, F. Massa.

Nepenthes Opiatum.

℞ Tincturæ Opii cum aceto distillato primum, deinde cum sp. Vini paratæ,
Extracti Croci per Vini spiritum . . . . . ana unciam unam
Salis Perlarum,
Corallorum . . . ana semunciam.
Tincturæ specierum Diambræ . drach. septem.
Ambræ griseæ . . . . . drach. unam.

Misce: Coagula ad formam Pilul. lento Balnei calore.

Hurstpierpoint. F. MITTEN.

HUECHYS VESICATORIA.

Sir,—The *Huechys vesicatoria*, identified for me by Dr. Gray, was described on p. 239 of my 'Chinese Materia Medica,' as the red lady-bug (*Hung-liang-tsz* in Chinese), and is thus spoken of:—"This insect, found upon the *Ailanthus*, and several other trees at Han Kow, is a sort of red cicada, making a grinding noise. It has a red body, and dark wings, and is collected in large quantities by the country people for the druggists, who use them as blistering-flies. They are much less powerful than the *Mylabris Cichrii*."

Shepton Mallet. F. PORTER SMITH.

SOUTH AUSTRALIA.

Sir,—Kindly allow me, through the medium of the Journal, to ask any reader—who may know—what prospects a chemist might have of success in South Australia. Is there a good field there for qualified men? What salaries are given? and what is the average cost of living, etc.?

I shall be glad of any information through the Journal.

R. G.

Medicus.—Your communication has been handed to the advertising agents, to whom it should have been addressed.

X. Y. Z.—We do not think a formation of an explosive mixture would take place.

A Member.—The conviction was for the sale of a scheduled poison by an unqualified person.

Phœnix.—Possibly there might have been some poisonous compound present resulting from the decomposition of casein mixed with the butter. See a paper by Dr. Vaughan, before, p. 147.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Thompson, Allen, Bracher and Co., Heilger and Co.

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OL. CARYOPH. ANG.
OL. CUBEBÆ ANG.
OL. COPAIBÆ ANG.
OL. CINNAM. VER. ANG.
OL. MYRISTICÆ ANG.
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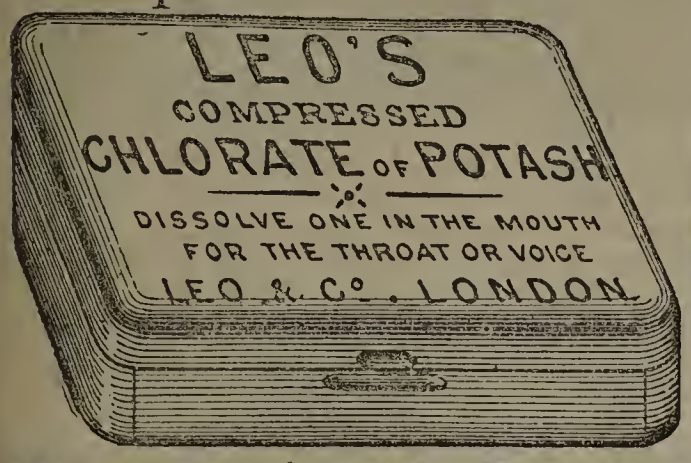

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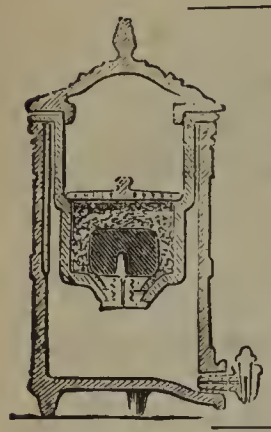

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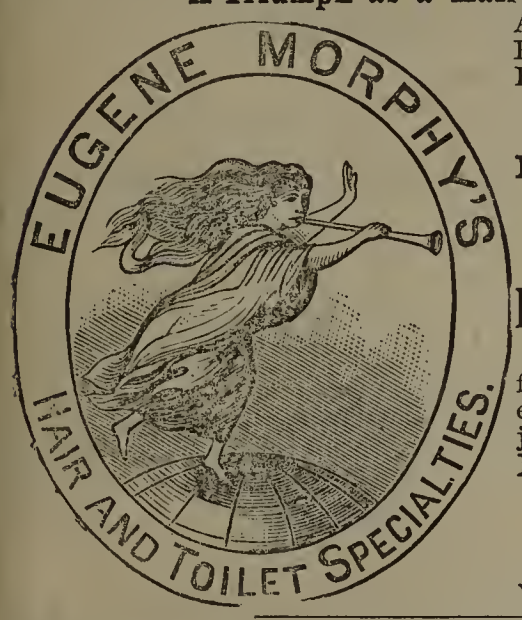

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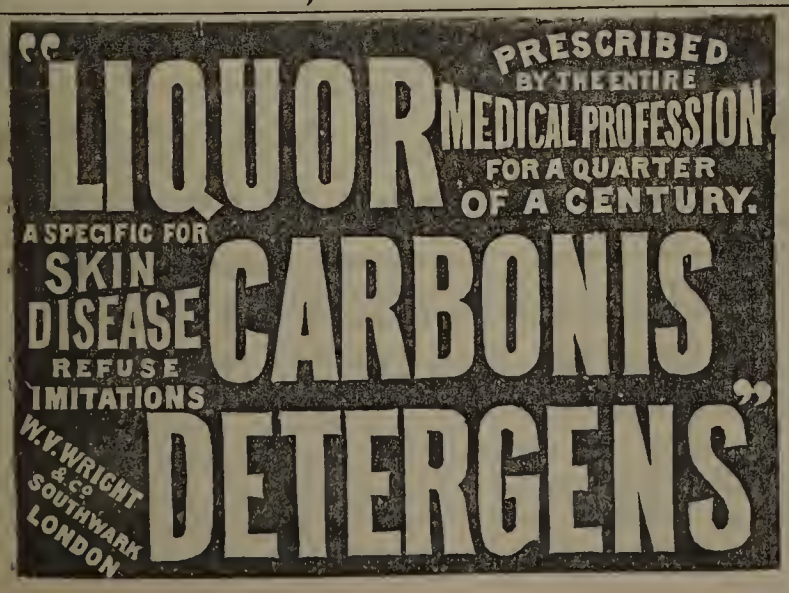

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THE NINETEENTH SESSION, 1886-7.

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„ „ 10 gr. 100 „		38/0
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„ „ 3 gr.	2/0	15/0
„ „ 3 gr. 100 in bottle		22/0
„ „ 5 gr. 100 „		24/0
„ „ 10 gr. 100 „		34/0
Ammon. Chlor. with Borax 100 „		30/0
Antipyrin 5 gr.		32/0
„ 5 gr. 100 in bottle		100/0
Bismuth Sub-nit. 5 gr. 100 „		38/0
„ „ 10 gr. 100 „		47/0
Caffeine Cit. 1 gr. 100 „		42/0
Cathartic Comp., U.S.P. 100 „		24/0
Cinchonidia Salicylate, 2 gr. 100 „		90/0
Cocaine with Potash and Borax (*see* Voice)		
Ipecac. and Opium 100 in bottle		38/0
Ipecac. Powd. 100 „		27/0
Iron and Quin. Cit.		15/0
„ „ 100 in bottle		42/0
Laxative Vegetable 100 „		24/0
Lithia Carbonate 2 gr. 100 „		42/0
Manganese Dioxide, 2 gr.		12/0
„ „ 2 gr. 100 in bottle		36/0
Pepsin Saccharated, 5 gr. 100 „		48/0
Peptonic	2/6	20/0
„	4/0	36/0
„ 100 in bottle	7/0	66/0
Potash Bicarbonate, 5 gr.	1/0	8/0
„ „ 5 gr.	2/0	15/0
„ „ 5 gr. 100 in bottle	3/0	22/0
Potash Chlorate 5 gr.	1/0	7/6
„ „ 5 gr.	2/0	14/0
Potash Chlor. ($2\frac{1}{2}$ gr.) with Borax ($2\frac{1}{2}$ gr.)	1/0	7/6
„ „ „ „ „ „	2/0	14/0
Potash Nit. (*Sal. Prun.*) 5 gr. 100 in bottle		27/0
Ptsh. Permanganate 1 gr. 100 „		24/0
„ „ 2 gr. 100 „		36/0
Potassium Bromide 5 gr. 100 „		27/0
„ „ 10 gr. 100 „		38/0
Potassium Iodide 5 gr. 100 „		42/0
*Quinine Bisulphate 1 gr. 100 „		24/0
*Quinine Bisulphate 2 gr. 100 in bottle		40/0
* „ „ 3 gr. 100 „		54/0
* „ „ 5 gr. 100 „		84/0
Rhubarb 3 gr. 25 „		10/0
„ 3 gr. 100 „		24/0
Soda Bicarbonate 5 gr.	1/0	8/0
„ „ 5 gr.	2/0	15/0
„ „ 5 gr. 100 in bottle	3/0	22/0
Soda Chlorate 5 gr.	1/0	8/6
„ „ 5 gr.	2/0	16/6
„ „ 5 gr. 100 in bottle	3/0	27/0
Soda Chlor. with Borax 5 gr.	1/0	8/6
„ „ „ 5 gr	2/0	16/6
„ „ „ 5 gr. 100 in bottle	3/0	27/0
Soda-Mint (*or Neutralising Tablets*)	1/0	8/0
„ „ „	2/0	15/0
„ „ „	3/0	22/0
Soda Salicylate 3 gr. 100 in bottle		38/0
„ „ 5 gr. 100 „		47/0
Soda Sulpho-carbolate 5 gr. 100 „		47/0
Sodium Bromide 5 gr. 100 „		38/0
„ „ 10 gr. 100 „		47/0
Sodium Iodide 5 gr. 100 „		52/0
Strophanthus (2 minims each)		10/6
Strophanthus (2 minims each) 100 in bottle		27/0
Test Tablets		22/0
Tonic Comp., Ferri Pyrophosph., 2 gr. „ Quinine, 1 gr. „ Strychnia Phos. $\frac{1}{100}$ gr.		80/0
Trinitrine (Nitro-Glycerine) $\frac{1}{100}$ gr. 25 in bottle		8/0
„ $\frac{1}{100}$ gr. 100 „		22/0
„ $\frac{1}{50}$ gr. 25 „		10/0
„ $\frac{1}{50}$ gr. 100 „		26/0
„ Comp. 25 „		14/0
„ „ 100 „		30/0
„ c. Amyl. 25 „		14/0
„ „ 100 „		30/0
Urethane 5 gr.		27/0
„ 5 gr. 100 in bottle		87/0
Voice Tabloids	1/0	7/6
„ „	2/0	14/0

* Subject to fluctuations of the Market.

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The
Pharmaceutical Journal
AND
Transactions.

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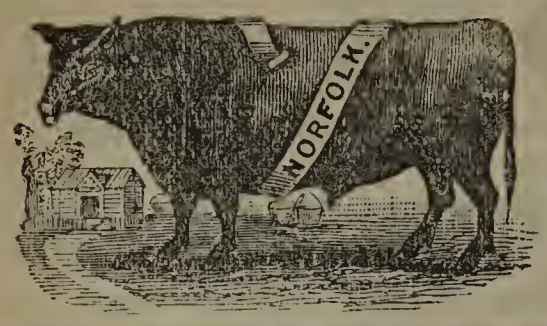

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EACH fluid drachm contains 8 grains of Ferrous Phosphate.

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LIQUOR Ferri Hypophosph.

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A THEORY OF EMULSIFICATION.*

BY WILLIAM GILMOUR.

I do not know that the title of this paper is altogether a happy one, but after some cogitation I could not devise a better. Probably the best idea of the scope of the note might be put in the form of a query, namely :—Why are emulsions directed always to be stirred in one direction? A belief of this kind generally prevails, but I have never seen any attempt to explain it. I was led into an investigation of the subject from a theory given by one of our eminent professors, to whom the question was propounded. His theory was (of course it was given off-hand) that so long as you stirred the emulsion in one direction you tended to break the volume of the oil, but immediately you reversed the motion you forced the volume of oil back upon itself. The theory was so simple, and appeared so satisfactory, that one was inclined to accept it as conclusive, and wonder that he had not thought of it before. On trying the experiment with a magnifying glass, the theory to all appearance was borne out. The oil on stirring with the emulsifier was quickly drawn out into long tapering filaments with offshoots in various direction, and of various forms. On reversing the motion these were driven back upon themselves, and caused the particles (or filaments) of oil to assume once more, to a greater or less degree, the globular form. So much for the theory; now for the fact. Carrying my experiments one stage further, I found that I could make an emulsion with the same ingredients and in the same proportions as in the former experiment with alternate motions from left to right and from right to left without the slightest difficulty, so long as I kept the emulsion well in hand, but with this difference that the emulsion took sometimes longer in being completed. I have experimented with castor, almond, and cod liver oils, using mucilage of gum arabic, mucilage of tragacanth, and yolk of egg as emulsifiers and all with the same result. The only difficulty I experienced with the double motion was towards the end of the process, when the emulsifier was, so to speak, approaching saturation. Here certainly the reversing of the motion tended to throw the emulsion out of gear more quickly than if the motion had been confined to one direction, but this I think is easily explained by the foregoing theory. There is therefore, I am disposed to think, a good deal of popular error in regard to the belief that an emulsion must always be stirred in one direction, and what little element of truth there is in it, is probably explained by the theory given.

[*The discussion on this paper is printed on p.* 793.]

PRACTICAL REMARKS ON PEARL-COATING OF PILLS.*

BY WILLIAM GILMOUR.

Pearl-coating has developed to a most extraordinary extent within the past few years, and at the present time is fast revolutionizing the pill-making department of the pharmacist's work. I am very sorry for this, for I quite foresee that in allowing this department to pass into the hands of large manufacturers we are fast drifting on to another rock not less serious than the patent medicine one. This subject is too acute for me to dwell upon at the present time, but let me point out in justification of what I have hinted at that while it is highly improbable that grocers and general dealers will be at the trouble and expense (even were it legal) to buy, spell out and consult the Pharmacopœia for the purpose of making pills, and afterwards coating them, there is nothing remotely improbable in them buying from the wholesale manufacturers, and successfully competing with the more highly educated pharmacist. I do not want to make more of this point than is necessary. It is only because I see clearly both the weakness and strength of our position, and in the hope of strengthening our weakness that I refer to it at all.

The first thing that I would notice in pearl-coating is that it involves a new departure from the modern tendency and spirit of the Pharmacopœia. Every recent change in the formulæ for "pilulæ" has been in the direction of producing a mass at once firm and plastic, and which would at the same time prevent the pills from getting too hard on keeping. Now the only element of success in pearl-coating, so far as my experience goes, is to have a hard dry pill to begin with. Beyond this and a little common sense to adapt quantities, and a little muscular exertion, there is nothing about the process which a child could not perform. But notice how the condition of hardness and dryness just mentioned agrees with the officinal formulæ. In the Pharmacopœia, there are in all, I think, twenty-one different "pilulæ," and of these fully one half contain ingredients which are utterly incompatible with pearl-coating. There are, for example, seven different masses made with such hygroscopic substances as glycerine and treacle; there are other four containing essential oils and other elements equally unworkable, and I venture to say that no human ingenuity will pearl-coat the pills made from such masses, and at the same time strictly adhere both to the letter and spirit of the Pharmacopœia. But if Mahomet does not go to the mountain, the mountain must go to Mahomet, and so the difficulty has been bridged over—But how?

A second point which I would notice is the amount of chalk required in this process. From a series of experiments which I have made, I find the amount required ranges from twenty to thirty per cent. of the weight of the pills coated. This makes a considerable increase both in the size and weight of the old 5 grain pill, and suggests, by the way, an increase in the size of the pill boxes in general use. It is not for me to say what the physiological effects of fifteen or twenty grains of an insoluble silicate per day may be on the human economy, particularly if continued for a length of time, as in the case of Blaud's pills, but it at least suggests the careful examination of the chalk used, in case of its contamination with any deleterious substance. This large amount of chalk may be increased or decreased at pleasure. If the liquid with which the pills are damped be too thick, or if too much be added, more chalk will be required, and the pills will be heavier and larger. Even ten per cent. of an increase by weight of chalk is not a bad profit were we to sell the pills by weight, but as we only retail them by number the hint is probably thrown away.

The three great difficulties which pharmacists will, however, probably require to face as regards successful pearl-coating, are "pitting," "falling" and "discoloration," and to each of these a word.

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, March, 16.

I have made a distinction between pitting and falling, as I look upon them as different troubles proceeding from distinct causes. Pitting gives the pills all the appearance of dried peas, while falling simply flattens them on the point of rest. Pitting in it worst form, I think, occurs in the compound colcynth pill, and therefore it may be taken as typical. It is generally ascribed to the resin of scammony, and, certainly, since the resin has been substituted for scammony the evil has increased. Still, other pills containing no resin of scammony undoubtedly pit also, and, therefore, I am inclined to look upon it more as an aggravating cause. As a rule, it will be found that all pills containing aloes, resins or gum resins in excess have a tendency under certain circumstances to pit. What are these circumstances? A theory was given me the other day which I may here throw out, although I have had no opportunity of verifying it. If the essential oil be added to the resin of scammony (reverting to the colocynth pill) before all the ingredients forming the mass are mixed—in other words, if the ingredients are thrown separately into a mortar and the oil of cloves added before mixing, the probability is that the oil might come into direct contact with the resin, and would, in some way, act upon it so as to change its physical properties, and prevent it again immediately hardening. There is this to support the theory, that even with the same ingredients the mass at different times exhibits different properties directly affecting the pill. This, in my experience, applies not only to the colocynth pill mass, but to others, also, which pit more or less on keeping. A soft aloes or a soft resin or gum to begin with, and an overworking of the mass, either with the pestle or the hands, produce very much the same results. In the case of the colocynth pill, if soap is substituted for sulphate of potash the tendency to pit is greatly lessened. I am no advocate for tampering with officinal formulæ, but sulphate of potash is really not required in the present pill, while soap, to my mind, is in every way an improvement.

Add to this suggestion a little care in securing hard dry aloes and resin of scammony, and also in forming a mass neither too hard nor too soft, and the trouble should be reduced to a minimum.

Falling will occur in almost any pill if made too soft, but I refer at present to falling from one peculiar cause, not generally noticed, namely friction. If you want a colocynth pill that will fall, use the rounder or finisher with all your might. Pills that require to be coated, require to be dry and hard. Of course they are rounded from time to time, each time probably as they get harder with increased friction, and so the mischief is done. In a short time the pills assume all forms as if they were not on good terms with each other. I have always attributed the peculiarity to the heat produced by the friction, and the cure is a little more care in finishing, so as not to require too much of the rounder, and a little attention to frequent shaking during the process of drying.

Discoloration however, is probably the most fertile cause of annoyance to be met with in pearl-coating, and as you all know the predisposing causes to discoloration, I need not dwell upon them. As I have already said, I am no advocate for substitution in officinal formulæ, but the difficulty must be bridged over. Fortunately it is here if anywhere that the pharmacist stands strongest. He does not require to stock his pills for twelve months, or even for six months. He has only to stick to the proper formulæ, dry them in the usual manner, coat them, and see how long they will keep, and prepare his stock accordingly. This is troublesome. Of course it is, but we need not expect to get any great good in this world without trouble. I would much prefer myself to mass the comp. rhubarb pill with syrup rather than treacle, and the comp. soap pill with water rather than glycerine, and do many other things not directed in the Pharmacopœia, but I do not see any change which I can make in this direction that would not in the end be to my own prejudice. I know some laugh at the idea of pills losing any of their active properties by the process of hardening, but I have proofs too abundant to doubt the fact for one moment. In the majority of cases the loss may not be noticed, but take an active cathartic pill such as the colycynth, and its action is not only greatly retarded, but also very much impaired.

The drying of pills must always be looked upon as one of the most important parts of the process. I have tried various plans, but have always come back to the old plan of drying on trays in a dry room. The pills are ready for coating whenever thoroughly dry on the outer surface, and while still a little soft towards the centre. In this state they will not keep long, but they will retain their maximum of activity.

In connection with the subject, I may mention that a gentleman, I believe known to you all (Mr. W. L. Howie), the end of last year worked out a process of giving to pearl-coated pills the character and sweetness of sugar by the use of Fahlberg's coal tar saccharine. I have seen some of the pills coated in this way, and from the great sweetening power of saccharine it seems admirably adapted for this purpose. Mr. Howie, I must tell you in case any one should be too enterprising, has patented his process, and I understand the patent covers the use of saccharine in all descriptions of coated pills as well as capsules.

I had intended to touch upon the coating of some extra-pharmacopœia pills, such as "Blaud's," but I am afraid I have already extended my remarks to too great a length. You will quite understand from the current of my remarks that I am not altogether in favour of pearl-coating. They may even give you the impressson that I am more averse to the process than I really am. It has its objections, and these I have tried to put before you. It has one other characteristic still, namely, that it makes a good made pill look much better, and a bad made pill much worse, and this last feature I look upon as the most important, seeing that there should not be such a thing as a bad made pill put out of our hands.

[*The discussion on this paper is printed on p.* 793.]

NOTE ON LIME WATER.*

BY J. INNES FRASER.

Some time ago I was struck with the different results of estimations made of liq. calcis which had been prepared strictly B.P. (*i.e.* shaking the lime in a bottle, allowing it to subside, and siphoning off) and of that prepared in a jar by stirring up the slaked lime, allowing it to subside, then filtering; the one case showed an equivalent of 6·16 grs. CaO

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, March, 16.

in the ten fluid ounces, the other, that which had been filtered, 5·26 grs.

The stock bottle from which the former sample had been taken was allowed to stand, about two-thirds full, for two days and another estimation made, when I was surprised to find that it still maintained the high standard of 6·16 grs. The temperature during these two days, however, had remained about the same, viz., 43° F.

The late prosecution in England recalled the circumstance to my memory, and being curious to know how the quality of the lime water sold here would compare with that which was the subject of the prosecution, I got samples—bought in the ordinary way—from different parts of the town, and estimated them ; and it is the result of these estimations that I have to lay before you to-night.

Eighteen samples in all were estimated; a quadrinormal volumetric solution of oxalic acid being used in preference to the B.P. solution. As will be seen from the table, 50 per cent. of these were below the B.P. standard, which, as you are aware, has been reduced from 5·6 grains to "about 5 grains" in the 10 fluid ounces, a standard which with ordinary care in preparation and storage should be easily maintained even in summer.

Sample.	C.c. used.	Equivalent in grains CaO in 10 fluid ounces.	Grains Ca_2HO in 10 fluid ounces.
A^1 .	10·4	5·82	7·69
A^2 .	11·0	6·16	8·14
A^3 .	9·4	5·26	6·95
B .	10·3	5·76	7·61
C .	10·0	5·60	7·40
D .	9·8	5·48	7·24
E^1 .	6·8	3·80	5·02
E^2 .	6·2	3·47	4·58
F .	10·1	5·65	7·46
G .	10·3	5·76	7·61
H .	3·0	1·63	2·22
I .	4·8	2·68	3·53
J .	0·8	0·448	9·592
K .	9·2	5·15	6·80
L .	7·2	4·03	5·32
M .	7·0	3·92	5·18
N .	6·0	3·36	4·44
O .	8·4	4·70	6·21

The sample marked J., shows merely a trace of lime, being less than a tenth of what the B.P. orders, and, to the palate, lime is just recognizable.

Samples H. and I. are also very bad ; H. showing about a third, and I. about half the official strength.

Samples $E.^1$, $E.^2$, L., M. and N., are not much better; and when it is remembered that 10 fluid ounces of water at 212° F. will dissolve about 3 grains of oxide of lime, it will be seen how little excuse there is for such deficiencies as are here shown, and that the Pharmacopœia does not demand too much. Of course, ordinary care must be taken in the preparation, and freshly slaked lime ought only to be used.

Lime water should be kept in as cool a place as possible, and not on the topmost shelf in the shop, where, I am told, one of the above samples (I.) was taken from.

I do not think any apology is needed for bringing forward such a subject as lime water ; for, I hold it is quite as necessary that such a preparation should be of proper strength as others considered of more importance.

[*The discussion on this paper is printed on p.* 793.]

NOTE ON THE CORROSION OF A ZINC REFRIGERATOR BY AMMONIUM CHLORIDE AND NITRATE OF POTASSIUM.*

BY JOHN HUTCHISON FISHER.

When metallic zinc is brought into contact with a solution of chloride of ammonium and nitrate of potassium in water it rapidly dissolves. This fact came under my notice in rather a striking manner only a short time ago, and the attempt to discover the reason why, which has occupied a considerable portion of my spare time ever since, has resulted in what this paper is meant to disclose.

A party who invested in a cheap ice cream machine, and was recommended to use a freezing mixture rather than the usual agents,—ice and salt,—applied to me for a powder or powders which would suit his purpose. I accordingly gave him a mixture of roughly-powdered sal ammoniac and common nitre. Next morning I learned that the experiment had hopelessly failed. The man, utterly ignorant of the necessary conditions to be observed, but imagining that were the powder dissolved the efficacy would be all the greater, and rightly concluding that most powders dissolve more readily in hot than cold water, actually used hot water in this experiment. After some hours' hard labour, he was more than astonished to find that the milk was not frozen, and simply horrified at discovering that his machine instead was dreadfully corroded and rendered quite useless.

Immediately after this untoward event, which completely wrecked the hopes and aspirations of the budding ice cream manufacturer, a case of poisoning by ice cream occurred in Glasgow, the poison not known, but variously regarded as being carbolic acid, poisonous colouring matter or a ptomaine. Curiosity having been aroused I waited upon the owner of the machine which had come to such a sudden and deplorable end and was supplied with part of the metal of which it was composed. This, upon examination, I found to be a tolerably pure specimen of the metal zinc. Upon making further inquiries in other quarters, I was informed that all ice cream machines were made of zinc, and that even the best of them, although coming in contact merely with ice and salt, were nevertheless constantly becoming worn and needing repairs.

Putting aside the question as to the cause of ice cream poisoning, I decided to discover in the first place, if possible, what really resulted from the action of the two salts upon metallic zinc. All the various text-books on chemistry which were available were silent on the subject, so that I was thrown entirely upon my own resources.

In conducting my experiments, I first of all exposed a few pieces of zinc for twenty-four hours to the action of a cold saturated solution of chloride of ammonium alone, and in a separate vessel to a similar solution of nitrate of potassium alone. In both cases the action or effect was very slight. I then boiled these solutions in separate test-tubes, and found that the effect, although still small, was decidedly greater than in the cold solution. I next made a cold saturated solution of both salts, using equal parts of each, and divided into two portions. One portion, with a few pieces of zinc added, was set aside for twenty-four hours; the other, after

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, March

having been boiled for two or three minutes, was also set aside for twenty-four hours. In the cold solution a marked change had been effected upon the zinc. It had lost its bright metallic lustre, become dull, and coated over with a greyish-white powdery substance. Upon examining the solution, abundant proofs of the presence of zinc were forthcoming. In the boiled solution the effects were still more marked, the presence of zinc being discovered in much greater quantity.

Upon subjecting the experiment to a more critical examination I discovered that when boiled ammonia gas (NH_3) was given off in considerable quantity, easily recognizable by smell. I then poured a fresh portion of the solution into a suitable vessel, added a little acetic acid, and distilled the acetic solution. To the distillate I added a few drops of dilute sulphuric acid, then a little solution of iodide of potassium, and lastly, mucilage of starch. The beautiful deep blue colouring indicating free iodine was at once produced. This as you know is Fleitman's test for a nitrite, which is considered a very delicate one.

The vagaries of the chloride, as well as of other salts of ammonium, and their proneness to combine with other salts to form double salts, is already sufficiently known. The hydrogen atoms in the basic ammonium being replaceable by other elements, both univalent and bivalent. Thus, by substitution of two atoms of univalent mercury for two atoms of hydrogen there is produced chloride of mercurous ammonium, and by one atom of bivalent mercury for two atoms of hydrogen, chloride of mercuric ammonium. From other salts various other compounds of a similar nature may be formed; nitrate of argent-ammonium, iodide of di-mercuric ammonium, and ammonio-sulphate of copper are familiar examples. Remembering this peculiarity of ammonium salts, I inclined to the belief that in the reaction under review a compound of this nature was formed. Accordingly, having made a concentrated solution of zinc, by operating upon a larger quantity of the metal and boiling for half an hour along with solution of chloride of ammonium and nitrate of potassium, I set the mixture aside to cool. I then found that a white curdy precipitate had formed. It seemed probable that this precipitate might be chloride of zinc ammonium having the formula NH_2ZnCl; but I have seen no published statement as to the existence of such a compound.

On thinking over the matter it seemed possible that the precipitate might be nothing more than zinc hydrate ($Zn2HO$) thrown out by the free ammonia produced in the reaction. Assuming this to be the case there were two ways in which the reaction might be explained. It was found that when any metal is heated with dry chloride of ammonium, chloride of the metal, ammonia gas and hydrogen are produced, thus—

$$Zn + 2H_4NCl = ZnCl_2 + NH_3 + H_2.$$

The same reaction was found to take place though much more slowly in solution. The nascent hydrogen thus produced would reduce the nitrate to nitrite of potassium, as represented by the following equation:—

(1) $Zn + 2NH_4Cl = ZnCl_2 + 2NH_3 + H_2$
(2) $KNO_3 + H_2 = KNO_2 + H_2O.$

It was also found that when Zn is boiled in a solution of KNO_3 the metal is oxidized and the KNO_3 reduced to KNO_2. The reaction might, therefore be represented as follows:—

(1) $Zn + KNO_3 = ZnO + KNO_2.$
(2) $ZnO + 2NH_4Cl = ZnCl_2 + NH_3 + H_2O.$

To determine this point the curdy precipitate was boiled in water, filtered and repeatedly washed with cold water until the filtrate ceased to give a precipitate with $AgNO_3$. It was thereafter divided into three portions. To the first portion KHO was added and a gentle heat applied, when ammonia gas was evolved in considerable quantity, instantly turning moist red litmus paper blue, and easily recognized by smell. The second portion was dissolved in dilute HNO_3 and treated with a solution of $AgNO_3$, when a copious white precipitate was at once thrown down, proving the presence of a chloride. To the third portion, which was also dissolved in dilute HNO_3, NH_4Cl, NH_4HO and NH_4HS were added, when a copious greyish precipitate (doubtless iron would be present as an impurity in the zinc) soluble in HCl was at once produced, proving the presence of zinc.

From these data it seems evident that the products of the reaction are chloride of zinc ammonium, which is insoluble in water, chloride of zinc, which is readily soluble in water, nitrite of potassium and ammonia gas. The reaction may be explained by the following equation:—

$$3Zn + 4NH_4Cl + 3KNO_3 =$$
$$2NH_2ZnCl + ZnCl_2 + 2NH_3 + 3KNO_2 + 3H_2O.$$

To determine whether or not the correct formula for chloride of zinc ammonium is NH_2ZnCl, it would be necessary to make a gravimetric analysis of the compound; but time did not permit of my carrying the investigation so far. It would be interesting to know if this compound is produced in the ordinary operation of adding ammonia to solution of $ZnCl_2$ to throw down $Zn2HO$, but this point I must also leave to one who may have more time and opportunity.

Such, gentlemen, is the conclusion at which I have arrived in this interesting chemical problem. I intended as I have said to have proceeded further, and tried to establish a connection between the formation of these poisonous zinc compounds and cases of poisoning by ice cream which occasionally occur. Want of time has hitherto prevented me from doing so. There are besides a number of difficulties in the way which require to be carefully investigated and considered. For instance, are freezing mixtures often used? Does chloride of sodium, which is commonly used, attack zinc in a manner similar to NH_4Cl? Were electrical action induced, as might very likely happen from the presence of other metals as impurities in the zinc, NaCl might act upon zinc in the same way as NH_4Cl. In the Leclanché's battery the exciting fluid is solution of NaCl, and the elements are zinc and carbon. The reaction is likely to be as follows:—

$$Zn + 2NaCl + 2H_2O = ZnCl_2 + 2NaHO + H_2.$$

This may possibly be the cause of the destruction of zinc refrigerators, where ice and salt are employed. In the event of leakage of solution of $ZnCl_2$ into the ice cream would it not immediately become fluid?

Until these queries have been satisfactorily answered it would not, I think, be prudent even to hint that $ZnCl_2$ is the irritant poison, which has hitherto been conjectured to be carbolic acid, poisonous colouring matter, or a poison of the nature of a ptomaine, developed in the milk itself.

It is sufficient meantime to mention that, so far as I have seen, the symptoms of ice cream poisoning correspond very closely to those of $ZnCl_2$ poisoning. I may perhaps at some future time push my investigations still further, and in the event of any real information being gleaned shall write another paper on the subject. Meanwhile, from what has already been shown, it is, I think, very necessary that manufacturers of refrigerators, who recommend freezing mixtures to be used, should understand the dangerous nature of the compound which may be formed, and also that the certain destruction of the machine itself may be only a question of, at most, a few weeks.

Owing to the comparative cheapness of zinc and its superiority over tin, in being more pliable and free from objectionable rust, it is now largely employed in the manufacture of quite a number of vessels and utensils, and on that account it is desirable that as much of its chemistry as possible should be known. If my few notes to-night be a contribution towards this end the reward is gained.

[*The discussion on this paper is printed on p.* 793.]

SYRUP OF TOLU BY A NEW PROCESS.*

BY FREDERICK STEPHENSON.

There are various published formulæ for the preparation of this syrup, the more important of which are as follows :—

1. The B.P. formula in which the balsam is ordered to be boiled with water for half an hour in a lightly covered vessel, filtered when cold, and the sugar dissolved in the filtrate by the aid of heat.

2. The former United States Pharmacopœia formula, in which tincture of tolu is rubbed up with carbonate of magnesia, a little sugar and water, filtered, and the sugar dissolved in the filtrate by the aid of heat.

3. In the French Codex the balsam is ordered to be digested for two hours with one half of the water at the temperature of a water-bath. It is then re-digested with the other half in the same way, the mixed liquids cooled, filtered, and the sugar dissolved by heat.

4. In the 1883 United States Pharmacopœia the balsam, sugar and water are ordered to be digested in a covered vessel for two hours at a temperature not exceeding 180° F., and strained though a wetted muslin strainer when cold.

The chief object to be aimed at in syrup of tolu appears to be to secure the full flavour of the balsam which is said to be due to tolene, cinnamate of benzyl and benzoate of benzyl, all of which are volatile liquids. It also contains doubtless small quantities of cinnamic and benzoic acids, but these do not appear to be of primary importance. On this account all the above formulæ strike one as more or less faulty.

Anyone who has made the syrup by the first process must have felt that the boiling caused a considerable loss of volatile odorous principles. The second process is also faulty for the reason that the carbonate of magnesia retains some of the volatile constituents as well as cinnamic and benzoic acids. It also renders the syrup slightly alkaline and, therefore, incompatible with alkaloidal salts.

The third and fourth formulæ, though perhaps a slight improvement on the first, are still open to the objection of employing too much heat. For the fourth process the advantage is claimed that the sugar aids solution of the aromatic principles, but it is open to the objection that a strong syrup is very difficult to filter bright.

In addition to the above formulæ it appears to be a very common practice to use one or other of the many concentrated liquors which are added to simple syrup in the proportion of 1 to 4. It is impossible to have a syrup answering to the official specific gravity by this method, and, so far as I have seen, the syrups so made are either very deficient in flavour, or possess a flavour other than the correct one.

It had often occurred to me that the balsam might be sufficiently exhausted by cold maceration, if the tolu was in a fine state of division, and the syrup completed without the application of heat ; and the following is the result of a few experiments by way of putting this idea to the proof. I proceeded as follows :—

Take of—

Balsam of tolu	1¼ oz.
Finest loaf sugar	2 lbs.
Water	16 ozs.

Reduce the balsam to powder by trituration with 8 ozs. of the sugar. Place them in a bottle with the water, and macerate for forty-eight hours with occasional agitation. Then filter through paper till bright, and dissolve the remainder of the sugar in the filtrate. This is best done by crushing (not powdering) the sugar, placing it in a percolator and passing the filtrate through. The result is a clear and very full flavoured syrup, which I think compares favourably with the product of any other published formula. It takes slow percolation to dissolve all the sugar unless the percolator is placed in a moderately warm place, but it might be worth considering whether so large a proportion of sugar is necessary. It is also a little difficult to completely clarify the syrup, and any suggestion in that direction would be an improvement.

[*The discussion on this paper is printed on p.* 794.]

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, March 16.

PRESENCE OF MANGANESE IN CHLORINATED LIME.*

BY ALEXANDER SHAND.

A few years ago, having occasion to make a quantity of liq. sodæ chlorinata, I used bicarbonate of soda, instead of the normal carbonate, in its preparation. I may mention that it was made by adding the chlorinated lime and bicarbonate of soda to the requisite quantity of water, and allowing the mixture to stand all night. Next morning I was greatly surprised to find the supernatant liquid of a beautiful pink colour. At the time I could not think of any reason for the colour, so, having made another quantity with the same result, I then used the normal carbonate and got the usual clear solution. Immediately afterwards, I looked up some books and made a few inquiries, but without any satisfactory result, except that manganese was thought of as a probable cause.

Two or three weeks ago, while preparing cobaltic hydrate by precipitating nitrate of cobalt with an alkaline solution of sodium hypochlorite, I was

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, March 16.

astonished to find the supernatant liquid pink-coloured after all the cobalt was precipitated. After a few simple tests, I came to the conclusion that the colour was due to permanganic acid, I therefore evaporated the solution down to a small bulk, separated the metal and proved it to be manganese. Of course, in this case, the manganese must have been present in the cobalt nitrate, but it brought back to my memory the facts mentioned before. I then commenced a few experiments on chlorinated lime, to find out for certain if manganese was present, and also the reactions that take place between bicarbonate of soda and chlorinated lime.

(I.) On boiling a small quantity of chlorinated lime with distilled water in a test tube and allowing the insoluble matter to settle, the colour of the liquid was quite pink, and on examination with a spectroscope showed the absorption bands due to permanganates. All the samples of chlorinated lime behaved in the same manner.

(II.) Prepared some solution of chlorinated soda according to the B.P. The first residue tested by Crum's test showed the pink colour. The filtrate showed no pink colour.

(III.) On mixing bicarbonate of soda and chlorinated lime in theoretical proportions and adding the proper quantity of water, and allowing the mixture to stand, the supernatant liquid was at first of a brown colour, but gradually changing to a reddish-pink. A little of solution filtered off immediately after mixing the compounds, after standing some hours, gradually showed a pink tint, while a slight sediment settled out.

(IV.) A quantity made the same as last (III.), but using carbonate of soda instead of bicarbonate, naturally remained quite clear.

(V.) On passing CO_2 into a portion of (IV.), experiment for four hours. The liquid became quite pink.

(VI.) On passing CO_2 into a mixture of chlorinated lime and water the liquid in half an hour had a yellowish-brown colour. The current of CO_2 was then stopped and the insoluble matter allowed to settle. The liquid gradually became pink coloured.

Now, theoretically, in whatever form the manganese gets into the chlorinated lime, or whether it is there from the first, which is unlikely; the greatest probability being that it is in the form of manganese chloride; the hypochlorite will, in presence of water, precipitate as manganese hydroxide.

So that on boiling chlorinated lime with water the calcium hypochlorite will act on the manganese oxide, oxidizing it to a permanganate, according to formula, $2CaCl_2O_2 + 2MnO_2 = CaMn_2O_8 + CaCl_2 + Cl_2$, or possibly, $3MnO_2 + CaCl_2O_2 = CaMn_2O_8 + MnCl_2$.

The same reaction, of course, will take place with liq. sodæ chlorinata, B.P., when manganese is added to it and the solution boiled, the soda in this case taking the place of the lime in the last. Now, when carbon dioxide is passed into calcium hypochlorite solution the calcium is precipitated as carbonate of lime, and free hypochlorous acid formed, which will slowly oxidize the manganese oxide if present to permanganic acid,

$$CaCl_2O_2 + CO_2 + H_2O = CaCO_3 + 2HClO,$$

then

$$4HClO + 2MnO_2 = H_2Mn_2O_8 + 2HCl + Cl_2.$$

The free hydrochloric acid would immediately decompose the permanganic acid, forming manganese oxide and free chlorine, thus,

$$H_2Mn_2O_8 + 6HCl = 2MnO_2 + 4H_2O + 3Cl_2;$$

but in the presence of an excess of $CaCO_3$, as we have here, I have found that it acts on the carbonate, leaving the permanganate unaltered,

$$H_2Mn_2O_8 + CaCO_3 + 2HCl = H_2Mn_2O_8 + CaCl_2 + H_2O + CO_2.$$

[*The discussion on this paper is printed on p.* 794.]

THE LAWS OF NATURE IN RELATION TO HEALTH.*

BY PROFESSOR JOHN ATTFIELD, F.R.S., ETC.

(*Concluded from page* 767.)

The Clothing we Wear.

From the extremes of heat and cold, even the healthy frame needs the protection of clothes. Now, natural law requires that these fabrics be bad conductors of heat; garments that in summer shall allow the minimum of the sun's heat to pass through to the already over-warm body, and in winter shall allow the minimum of the warmth of the body to escape to the outer cold air. Oddly enough, the best non-conductor is air itself; but it must be non-moving or very slowly moving air; so that if we can manage to enclose a sheet of air between appropriate sheaths, or imprison it in an appropriate net, we shall have a typical garment both for summer and winter wear. Such a garment is found in the woollen clothes or flannel of the cricketer's summer suit, and the woollen dress or overcoat of winter. A blanket is a similar covering, of world-wide appreciation, against the escape of warmth from the body during a cold night. An eider-down quilt is a similar air-enclosing shield of wonderful lightness. These fabrics are those which best enclose a layer of air, and it is this layer of entangled and scarcely moving air which gives to them their usefulness. It is the air within the blanket or cloth of wool, not the wool itself, which arrests the passage of heat. So it is with cotton or with linen. Place the hand on a layer of unspun cotton, commonly termed cotton-wool. The feeling is that of warmth. Spin the stuff into a thread and weave the thread into sheeting, and place the hand on the sheeting. The feeling is that of coldness. Obviously, there has been no change in the material itself, therefore it is the change in the condition of the material that has resulted in the change of effect from warmth to coldness. Either cotton itself or linen itself, that is, flax, is not by any means a bad conductor of heat; a sheet of cotton or of linen feels cold enough to the hand or foot; in other words it rapidly conducts heat away from the skin. Bring that same cotton or that same flax in the unspun or woolly condition against the skin and it feels warm. The fact is that, in the latter cases, very little of the layer of actual cotton or of flax, but a great deal of the entangled layer of air, is brought against the skin; and the layer of air, being a good non-conductor of heat, takes so little heat away that relatively we regard the materials as being warm. Wool or similar hairs of various kinds, silk, flax, cotton, are all useful as materials for clothes, the porous condition of the material rather than the material itself being the main consideration. Even skin, whether thick for foot-covering in the form of boots, or thin for hand-covering in the form of gloves, has its value for health purposes; but any extended use of such a slightly porous material as skin is inconsistant with the laws of health. The non-porous india-rubber waterproof clothing must only be worn when one desires to avoid the lesser of two evils, namely, the lesser disadvantage of over-action of the pores of the skin as against the greater dangers attending the wearing of wet clothes. These "waterproofs" must be taken off at the earliest possible moment.

The laws of heat govern the effect of the colours or pigments with which clothing is dyed as well as the effect

* Presidential Address delivered at the Annual Meeting of the Hertfordshire Natural History Society at Watford, February 15, 1887.

of the material itself. A given fabric will reflect more heat if it is white than if it is black, and, generally, will have a somewhat varying power as a conductor or as a non-conductor of heat according to its colour. This influence of colour is, of course greater in fabrics that enclose but little air than in those which enclose much air. The material of which a given pigment or dye is formed has some influence; different black dyes, for example, differing in their power of absorbing heat.

Chemical and physical science, speaking by the mouth of the goddess Hygieia, has little more to say respecting the laws which govern the clothing we wear. The voice of the goddess of ornamentation is much louder; while the lungs of the votaries of fashion, in one century of one sex, in another of the other sex, drown the voices of many goddesses and ever produce a veritable Babel.

Other Contributories to Health.

No allusion has been made to personal cleanliness; nor to that change of employment termed recreation, nor to physical exercise, nor to rest. For in these four matters, not only is there a fairly extended recognition of the fact that the laws of nature governing them cannot be disregarded with impunity, but there also does exist amongst people generally such a fair amount of knowledge on these subjects that it is now unnecessary to do more than mention them. Whether health will be best promoted at any given time by attention to cleanliness, recreation, more serious physical exercise, relaxation, or rest, must be left to the individual judgment. All are alluded to in the following pretty epigram from the Latin, "On a Natural Grotto near a Deep Stream":—

"Health, rose-lipp'd cherub, haunts this spot,
She slumbers oft in yonder nook:
If in the shade you find her not,
Plunge—and you'll find her in the brook."

The Dwellings we Occupy.

Into the question of healthy houses, regarded merely as dwellings, questions relating either to food or to clothes scarcely enter. Not so the question of water supply, which is almost inseparable from that of the dwelling. Indeed, a full supply of pure water, a proper supply of pure air, and neither excess nor deficiency of warmth, are the chief desiderata as regards healthy habitations.

Man almost necessarily dwells only where nature supplies animal and vegetable life with a fairly regular supply of water. Under the laws of heat, water is drawn up into the atmosphere as a pure invisible vapour from the more or less pure stores on land, or the more or less saline stores of the seas. That vapour condenses to visible cloud in the atmosphere, whence, under the laws of gravitation, it again is drawn to the earth. From the earth over which the fallen rain flows, it dissolves, under chemico-physical laws, certain mineral substances which do not injure and perhaps promote the health of persons drinking the water. From the earth also, especially from its cultivated portions, the water dissolves, again under chemico-physical laws, certain products of animal and vegetable decay which doubtless are or may be harmful to persons drinking the water. No sooner, however, are these impurities dissolved than nature, under chemical laws, begins to burn them up by the air dissolved in the water: and before the water has flowed far over or into the ground, it again has become hygienically pure, that is to say, entirely free from anything injurious to health. The slightest recognition by man of the working of the laws just mentioned, would prevent him adding animal or vegetable impurities to water at the very moment of all others when nature has brought pure water to the actual dwelling he occupies. But alas! man is ignorant of such laws, and ignorant is he likely to remain until some of his teachers, under an enlightened view of nature's laws and their origin, weekly preach those laws into his ears. A comparatively few yards of porous soil free from actual clefts will convert into hygienically pure water all the impurities cast out of a dwelling house. There is not the slightest reason, except what is born of excusable—at present excusable—ignorance, or inexcusable carelessness, why the well-water of more or less isolated rural or suburban dwellings should be contaminated by household drainage or by any similar collections of impurities. Such refuse should be distributed properly instead of improperly to the adjacent ground, and then there would be no risk of the well being contaminated.

How to obtain a proper supply of fresh air to our dwellings, in quantity neither too large nor too small, and in temperature neither too high nor too low, is an extremely difficult question. This difficulty is not due to want of knowledge of the laws governing the matter. The laws of heat are ever at work, and also can be invoked artificially, to provide displacement of impure air by pure air, and the laws of diffusion of gases are ever at work providing for the removal of used-up or tainted air. The difficulty chiefly consists in our inability to apply our knowledge under ever-varying conditions. Take even the case of an isolated dwelling, standing within two or three acres or more of ground, where the external air is pure, and occupied and owned by a man who has the means and the will wherewith to obtain a proper supply of that fresh air for his household. The capacity of any given room does not vary; practically it always holds the same volume of air. But the persons who respire the air in that room may vary in number from two or three to twenty or thirty. The air in the room requires to be changed ten times as often for twenty or thirty as for two or three persons. What mechanical system of ventilation without draughts can be trusted to provide for such a state of things? Practically none. This difficulty is increased, obviously, by the facts that we can have little or no control over the temperatures of the external air that is to enter and displace that already within the room, and that those temperatures may vary greatly, especially in such a country as ours. The varying direction and varying force of the wind will also materially complicate the problem of satisfactory ventilation. All these difficulties are enhanced if the house is closely packed amongst others, or if the occupants are poor, or if the external air is liable to be impure.

Of course there is another side to the foregoing picture. An occupied house is always warmer inside than outside, hence the whole bulk of air it encloses is, under the laws of heat, ever rising up through and out of the house, especially from its upper parts, while a corresponding quantity of fresh air is ever entering the house, especially at the ground floor. Again, under the laws of diffusion, the moment the air of a room is rendered impure, and during the whole time that it continues impure, it and the external pure air commence and continue slowly to interchange with each other, through chimneys and open doors and windows, through chinks and cracks, and even through ceilings, walls and floor. Again, the available amount of air in a room may be, and perhaps generally is, under ordinary conditions, much larger than the amount nature demands for the health of the few persons who habitually occupy the room. Again, most persons, even invalids, can bear a considerable change of the air near them, especially if the bulk of air moves, without catching cold. Again, the systems of fairly healthy persons can stand the inhalation of even highly impure air for the short periods of the various kinds of gatherings or meetings they may have occasion to attend without any serious or prolonged harm to health. Lastly, when crowded rooms become unbearably close, yet must continue to be crowded for some time longer, and windows or doors or both consequently have to be opened wide, there are generally some persons who can bear without injury, or with only temporary inconvenience, the strong draught of inflowing air near such openings. With all these mitigations granted, however, there remains the fact that a certain amount of ventilation is essential to the occupants of all rooms; while it also is certain that the purchasable contrivances termed "ventilators" cannot

be efficient ventilators under all the varying conditions mentioned.

What is the remedy against the imperfect ventilation of rooms? Fortunately experience teaches everybody something of the working of nature's laws respecting this matter. A person of even moderate intelligence can open a window or a door where a draught will injure no one. In an average household some of the members will have sufficient knowledge to enable them, at any considerable gathering of persons where perhaps also many air-consuming lights are burning, to distribute the air from open windows by aid of curtains so judiciously disposed as to allow of the entrance of the maximum amount of air with the minimum of draught. Perhaps the best form of ventilator is the old tube reintroduced by Tobin; a wooden or zinc tube a few inches broad, several inches wide, and about five feet long, placed in any more or less out-of-sight place in the room, the bottom end communicating with the external air by a similar, generally very short transverse tube carried through the wall. Such tubes may vary in size, or two or more may be used in large rooms. They really are inverted syphons, the slight warmth of the inside of the room above the outside enabling them by well-known natural laws continuously to carry inwards a current of air which quietly breaks in a fan-like manner into the upper part of the room above the heads of the occupants, a continuous change of air without a draught resulting. Window sashes may be arranged on a similar principle but with less effect. According to the number of occupants of the room each tube should at its upper extremity be closed, or partially closed by a lid, or be left quite open. Even these tubes, therefore, need a little intelligent management. In short, the extent to which a room may be fairly successfully ventilated depends on the extent to which some one or more of its occupants realizes and applies the natural principles involved. A proper supply of pure air to our dwellings can never be obtained merely by ventilators or other mechanical contrivances, it must always depend upon intelligence and knowledge.

The avoidance of extreme heat in summer and extreme cold in winter in our habitations is a matter of considerable importance as regards our comfort, and not inconsiderable as regards our health. Here experience guided by intelligence helps us much, while the natural laws which govern the matter are not at all obscure. A room which in summer has become pleasantly cool during a night may be kept cool until it is wanted, if blinds, curtains and shutters are closed over the windows, and the door or doors not left open. For convection of heat to the walls of the room by currents of hot air from without is thus avoided, diffusion between the hot air without and the cold air within is thus retarded, while any direct rays of heat from the sun are excluded. With a little light admitted such a room may then be occupied by two or three persons, at all events by a few in relation to the size of the room, for several hours before the air inside becomes as warm as the air outside or before ventilation is really needed. When either of the two latter conditions is nearly reached doors and windows must be opened. For the advantage of a lower temperature in the room having ceased, the next best condition of comfort is to provide if possible for a continuous movement of air or gentle draught, "a lovely breeze," the moving air taking away moisture from the skin and producing a grateful sense of coolness.

The avoidance of extreme cold in rooms in winter depends, fortunately in some cases, unfortunately in others, almost solely on expense; for the laws of the matter are well known and their application quite easy. The burning of coals or other fuel in a open grate, as commonly practised in England, is doubtless absurdly extravagant when considered solely as a source of heat, more than three-fourths of the heat escaping up the chimney. Yet the chimney thus draws within itself a quantity of air over and above that needed for the combustion of the fuel, producing better ventilation of the apartment than would be obtained by less escape of heat up the chimney. Secondly, under such an arrangement gradations of warmth are obtained; for one may have general warmth by sitting at some distance from the fire, or may get a large amount of warmth in a short space of time, and exactly at the moment one most wants warmth, by standing for a minute or two quite near the fire. Thirdly, a bright open fire is a thing of beauty worth paying for. To warm the whole atmosphere of a house, or its chief sections, by heated pipes is more economical from the point of view of a mere warming arrangement, and, while less pleasant than an open fire to persons coming in from the cold external air and desiring to be quickly warmed, nevertheless, gives a more general sense of comfort to those who remain for most of their time indoors. However, it is, again, a question whether one is not, on the whole, rendered more susceptible to cold when one leaves the house in winter if one has been living night and day in the temperate climate of pipe-warmed rooms and passages. The whole subject is obviously one rather for individual than general consideration; one to be decided by the conditions, occupations and resources of those dwelling in any given house.

The Towns we Inhabit.

The laws of nature affecting the health of the individual having been considered, and some further natural laws governing the health of households, especially in isolated habitations, having been set forth, there remain for treatment only the laws which operate in the special set of conditions produced by that close contiguity of dwellings characteristic of cities and towns.

The total amount of fluid and solid impurities of all kinds cast forth from the kitchens and other parts of more than a given number of houses per acre of ground —irrespective of dust-bin refuse which can be removed by cartage—quite overtasks the natural chemical purifying powers of that ground. Hence, in the first place, pure water cannot be obtained from wells sunk in such ground, and must therefore be brought to the town from some distant area by a system of open and closed mains and pipes. In the second place, especially with a somewhat larger number of houses, the total quantity of impurity cast forth becomes such a source of contamination, not only to the water of wells in the neighbourhood, but to the air, that it must be taken away from the town by a system of pipes, drains, etc., to some distant area. Here the laws of nature cannot be evaded; and their working is simple. A household must, in nearly every case, get its supply of water, say twenty or thirty gallons per head daily, from the earth, and when that water has done its duty of washing, cooking, etc., it must be returned to the earth. If the dwelling is isolated in an acre or so of porous ground, this intake of pure water and output of sullied water may go on within that area. If dwellings are crowded together, the intake of pure water must be from a distant area in one direction, and the output of sullied water must be to a distant area in another direction. But in both cases there must be ground whence to draw the clean water and ground on which to cast the dirty water. In both cases, too, we may trust to nature, and we may implicitly trust her, to convert the impure water into pure water ready again for the use of man. For, be it remembered, the stock of water in the world never varies. The water man has used before he will use again, and again, and again; each time perfectly purified in nature's perfectly appointed laboratory. It may be that a given country, in its wisdom, believing that it is choosing the lesser of two evils, elects to send more or less of its sullied water direct to its rivers and so into the sea. In that case the only variation in effects—in the intermediate effects—will be that the country will *pro tanto* lose the manurial value of that sullied water. Further, to the extent to which a country thus incurs an expenditure larger than

its income, will it sooner or later become bankrupt. The result may not ensue for many generations, but come it must, unless a true spirit of patriotism realizes and avoids the evil. Be that as it may, the incidence of the laws of nature, fortunately, cannot be avoided. The sulliage of sullied water is sooner or later burnt out of the water by the burning power of the air always being absorbed by such water, or with which the water comes into contact during its flow towards the sea or in the sea itself. From the sea, as already stated, the water is lifted into the air as cloud, and is carried back by winds again to fall in full abundance at the very feet of man.

The gregarious tendencies of human beings not only involve difficulty as regards the getting of plenty of pure water and the getting rid of that water when sullied, but also as regards the getting of abundance of pure air and the getting rid of that air when sullied. And the larger the aggregation of people, the greater the difficulty. A human being in breathing renders a certain and rather large amount of air impure every moment of his life. Every scoopful of coal burned in a grate, every pound of burning candles, every pint of oil consumed in a lamp, every cubic foot of burning gas, renders impure a corresponding and very large amount of air. This impure air passes up and away into the atmosphere, sometimes under the laws of heat which harness and rein the wind, and always under the laws of diffusion. Fortunately the largest city is not yet so large as to interfere with impure air exhaled from throats and chimneys getting away sufficiently fast, and pure air taking its place sufficiently fast, to maintain millions of inhabitants in a fair state of health. The trouble rather is, at present, that owing to imperfections in the construction of domestic fire-grates and large furnaces, the fair and invisible gaseous product of the combustion of all fuel is accompanied by sooty, oily, and other fog-forming intermediate products. For this evil let us hope that art will sooner or later furnish a complete remedy. Nature furnishes the remedy against the accumulation of impure gas in the atmosphere generally; for the impurity which would be poison and death to the animal kingdom is food and life to the vegetable kingdom, and thus is the atmosphere as a whole kept always in a normal health-giving condition.

Another, and, as regards the preservation of health from the attack of infectious disease, more serious source of contamination of the air of towns, is to be found in the delivery of foul vapours from certain of the gratings at our very feet as we walk along our streets and roads. Now this subject is in several senses unsavoury, but it is one that affects the health of ourselves and the health and perhaps lives of our children. Therefore no apology is offered for its introduction. Indeed it is time that the public, men and women too, should speak out strongly once for all on the matter. There is a general impression, and it is probably a right impression, that we have gone a little too far in the matter of sewer-ventilation—a little too far in a wrong direction. We are told, doubtless rightly told, that certain fevers which decimated the inhabitants of our towns up to a hundred or even fifty years ago, were probably largely due to the emanations from open urban ditches and similar collections of impurities. Well, we filled up the unsightly conduits, we avoided pestilential accumulations, and we substituted closed pipes and drains. But now, under some fancy that these tubular channels all need ventilating, we adopt such mechanical contrivances as shall, or, at all events, may and often do, bring the noisome vapour to the feet of adults or children at any moment as they walk past the gratings in the ground, or, much worse, bring it to the mouths and nostrils of girls and boys as they play near or perhaps actually peer into the grid-guarded caverns. True, we do not allow the contents of the passages to stagnate, as in old days, but so far as we ventilate them, that is, wash them out with air, and bring that possibly pestilential air to the lungs of human beings, to that extent we are making a retrograde movement towards the fever-breeding arrangements of pre-sanitary history. If our practice in this respect is right, we ought to increase the number of these gratings, or, indeed, have open ironwork along the whole length of these reeking aqueducts. If the practice is right why not dry up, by the ventilating current of air, not a part only of the fluid, but the whole? But our practice, in my opinion, is not right. These mains do not need ventilation, or not as a rule. In our larger cities, wherever the horrid galleries are of a character to need workmen within them, ventilation is necessary for the sake of the men, lest they "be stifled in the vault to whose foul mouth no healthsome air breathes in." But such large mains generally run under wide roads whence the vapour can, through the gratings in the centre of the road, the more readily escape up into the atmosphere. At all events ventilation then offers the minimum of evil. But why drains into which a man never goes, which are in fact too small for a man to enter, should all be ventilated, is beyond my comprehension. Of course there must be no such pressure within them—caused by the rush of flushing-water or what not—as to drive their vapour-laden air past the water traps of our homes into the rooms in which we live. But some judiciously disposed vent-pipes, such as are largely used already, opening above the ground level, but not near windows or other inlets of houses, will prevent that result. These vent-pipes (do not call them ventilating pipes, for there should be no such current of air through them as constitutes true ventilation) can be kept clear by a semi-annual inspection costing far less than the labour necessary for keeping clear the objectionable ground-level gratings. Some persons seem to be under the impression that poisonous gas is always generated in these sullied-water passages, and that this gas needs to be diluted with as much air as can possibly be drawn into and out of the loathsome watercourses. Now the contents of these courses, in any properly regulated district, are never allowed to stagnate long enough to produce gas; secondly, even the stagnant stuff rarely produces a paltry few bubbles of gas; thirdly, such gas is probably harmless. No, the exact constituent causing harmfulness is not known, but what carries or conveys that constituent is the vapour of the smelling stream. The stream will saturate the air in the drains with its vapour just as a perfume will saturate the air in a scent-bottle with its vapour. Ventilate the scent bottle, that is, arrange for a current of air to pass through the bottle, and what will happen? Each fresh quantity of air will soon be saturated with the vapour of the perfume, and as you drive out or draw out that quantity, fresh air will enter to be again saturated, and so on until you have dried out much of the perfume. Ventilate the polluted passages alluded to, and what happens? Each fresh quantity of air drawn in will soon be saturated with the vapour of the filthy fluid, and as you drive out or draw out that quantity, fresh air will enter to be again saturated, and so on until you have dried out much of the fluid. In fact, the process is not one of fair dilution or ventilation at all, it is a process of slow evaporation; for nobody should dream of truly ventilating any apartment at the bottom of which vapour-yielding fluid is ever running, or on the floor or in the corners of which moist masses of microbe-yielding mud are ever resting. The removal of the vitiated air of such a room by inflowing pure air would immediately be succeeded by the vitiation of the latter, and so on, and so on, night and day *ad nauseam*. That is a fair picture of what its advocates are pleased to term sewer-ventilation. It is not true ventilation at all; it is a slow, continuous but never complete, drying up of liquid and solid sewage, carried on in the midst of our homes, playgrounds, and promenades. There is not the slightest occasion to continue this loathsome, this repulsive vapour-carrying and perhaps fever-carrying process. There is not the slightest occasion to ventilate all these treacherous tunnels. Fortunately air is not often flowing at any important rate into or out of them but

that it is sometimes flowing out most persons who often pass the ground-level gratings can testify. To put the matter shortly and plainly. A sewer is like a scent-bottle, the longer you ventilate it the longer it will smell, while any fluid remains. Don't you want it to smell? No? Then don't ventilate it. Do away with the ground-level gratings altogether, except where men work in the gross galleries below; never attempt to ventilate, really ventilate, all these tubes of turbidity; only where pressure is liable to accumulate place vent-pipes whose external orifice shall be far above the heads of the inhabitants of the town, and as far as may be from the windows of houses. If you *must* extract the vapour-laden air, burn it. But what is required, as a rule, is *vent, not ventilation.*

Conclusion.

In this address an attempt has been made to direct attention to the laws of nature as related to health: as related in the important personal matters of the food we eat, the fluids we drink, the air we breathe, and the clothes we wear; in the important matters of water-supply, ventilation, and due warmth in our dwellings; and in the important matters of refuse-disposal and pure air-supply of our towns.

To the extent to which the individual acts in harmony with natural law, to that extent will he have health. To the extent to which a household acts in harmony with natural law, to that extent will a household have health. To the extent to which a local community acts in harmony with natural laws, both by its units and by the members and officers of its Board of Health—some of whom must possess adequate chemical, physical, and biological, as well as general medical knowledge—to that extent will the town or city have health. To the extent to which a nation realizes and places itself in harmony with the laws of nature that govern the health of its individuals, the health of its households, and the health of its communities, to that extent will the nation have national health, prosperity, and happiness, and to that extent will it contribute to the health, happiness, and prosperity of all nations and races which recognize the sway of natural law. Finally, to the extent to which a generation lives, moves, and has its being, less and less in accordance with the empiricism of past generations and more and more in accordance with the laws of nature, to that extent will the children of that generation, the parents of generations yet to be, become more and more healthy, and the sooner develop into all that man is destined to become.

'Yet I doubt not thro' the ages one increasing purpose runs,
And the thoughts of men are widen'd with the process of the suns."

NOTE ON POTABLE GOLD.

BY ROBERT MODLEN.

Gold has from the earliest times been the subject of innumerable experiments at the hands of alchemists, physicians, etc., in the hope that a medicine might be prepared from it in some degree corresponding to the estimation in which the metal itself was held. In an old book in the Pharmaceutical Society's library there are several descriptions of the mode of preparing gold for medicinal purposes, and the uses for which it was recommended are as numerous as those to which certain so-called patent medicines of our own day may be put.

"The potable golde, sayeth the singular Fioravente, is a dyvine lycour, to which none other may be compared, that the auncient and later philosophers have by dilligent studye, great search, art and practise, dyverselye sought and laboured to dissolve and make this pocion of gold, and have also attempted sundry and dyvers wayes . . . . Some there were that before the distyllation did diverselie calcyne the golde to bring it to dissolving; others there were which laboured to dissolve the golde with aqua fortis, and others, after the calcyning, have endeavoured to dissolve the golde with aqua vitæ; and thus many have travayled without lyght in the searche of the arte, having neyther knowledge, skyll, nor yet experience." He then goes on to give a very long and complicated method of preparing this "most precious lycour, so greatlye and highlye esteemed of mortall creatures, not without desart; in that the same is a substantial essence, and as it were another soule, yea, our lyfe this potable golde may be named, for the sundry effectes, ryght wonderfull, that it in desperate cases hath wrought." The first part of the process is to kill and draw a large hen, and then to distribute an ounce of gold in incisions in the fleshy parts. This is to be done while the body is warm, and the heat is to be maintained in "an apt place" for thirty-five hours in order to dissolve the gold, "for there is a certayne hydde propertye in the hennes flesh for the dyssolving of golde." Then wash the various incisions thoroughly with water of honey, mix this with an equal quantity of aqua vitæ (itself a wonderful preparation), and add a drachm of "salt armoniacke" to each pint of mixture, which is then to be enclosed in a heap of horse manure for three months. At the end of every month the clear liquid is to be drawn off, and the dregs are finally distilled. After mixing the various solutions and the distillate, bury them again in a glass vessel for twenty-five days in a heap of fresh horse manure. "And then have you purchased potable golde, easilye prepared and with small cost; which by his marvaylous propertye and great virtue, rayseth in a manner the dead."

There were, as Fioraventus remarks above, other methods of preparing the gold, but as space is limited, I cannot refer to them in detail, but must pass on to the various uses to which it was put.

As may be supposed, such a precious medicine must be carefully given, so we find that one drachm of the liquid was to be mixed with an ounce of "Juleppe of Violets," and given in broth. "And if any sicke person be at the point of death, in giving such a lycour, shall lyve a farre longer tyme than perhappes he might doe without it; and many by the dryncking of it have recovered lyfe and health a long time after." "It yieldeth or procureth joye of the heart, and increaseth the strength of the same, and putteth awaye sicknesses. It stayeth back olde age, increasing natural humors, and preserveth all the partes of the body without harme or decay; it cureth the Lepry, clenseth the blood, helpeth the shedding of heyre, if it be given with Endyve water." Unlike Macbeth's physician, it could "minister to a mind deceased," removing melancholy and restoring "memorye corrupt;" given in borage water it cured "all maner of madnesse." It "helpeth an astonished sicknesse," whatever such a complaint may have been, and if taken with a decoction of peony roots, collected in the waxing or waning of the moon, it cured the falling sickness. In short, of all the ills that flesh is heir to, the greater part would seem to be more or less amenable to this wondrous medicine.

At a time when gold was much less common than now, there appears, in fact, to have been a fascination in it, which led men to imagine that they could discover in it a panacea, if they only went to work the right way.

It is worthy of remark that while silver is very much more used than gold in modern practice, in the work from which this account is taken the preparation of silver for medicinal purposes is dismissed in six lines, no notice being taken of its properties, while the description of the various forms and uses of gold occupies no fewer than twenty-six pages. The silver was made into an acetate.

The work from which this account is compiled is called the 'Newe Jewell of Health,' and is by Conrad Gesner, of whom, and of another of whose works, I recently gave a short description (p. 625). Like the 'Treasure of Euonymus,' it is a translation from the Latin, but published in 1576, seventeen years later, and is not so well got up, either as regards the engravings or letter-press.

Gillingham, Chatham.

The Pharmaceutical Journal.

SATURDAY, MARCH 26, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BENEVOLENT FUND.

WE are now within a few weeks of the expiration of the period of ten years since the last Benevolent Fund Dinner was held in 1877, and the Council having at its last meeting decided that the practice hitherto adopted of having a Benevolent Fund Festival should not be departed from, it will not be out of place to remind our readers of these facts, and at the same time to point out for the information of those who have not hitherto taken much interest in the Benevolent Fund some of the circumstances which should recommend this institution to the consideration of all members of the trade, and especially of all who are more directly connected with the Pharmaceutical Society. In the first place it must be remembered that while the expenses of working and administering the Fund are borne almost entirely by the Society, the whole of the income arising from interest upon invested capital and from subscriptions or donations is now made available for the relief of cases of distress or misfortune affecting all persons who are upon the Register of Chemists and Druggists, whether connected with the Society or not. This is a circumstance that should alone be an inducement to members of the trade to become subscribers to the Fund, and we again call attention to it because we believe that it is still far from being so generally understood and appreciated as it ought to be. On no other view does it seem possible to account for the comparatively small number of those on the Register of Chemists and Druggists who are contributors to this useful Fund. This will be evident from the fact, that although many persons subscribe from one to ten guineas annually, the whole income in the shape of subscriptions to the Fund has never yet risen much above fifteen hundred pounds a year. But if every member of the trade were to subscribe only five shillings a year the amount raised would be upwards of double that sum, and the capacity of relieving distress would be proportionately increased. This is a view of the matter which we believe only requires to be made sufficiently well known to ensure a considerable accession to the number of supporters of the Fund, and it is to be hoped that the Society's local secretaries, in their annual visit to the members of the trade in their respective neighbourhoods, will not relax their efforts to extend this knowledge. Even those who, we regret to say, are not disposed to support the Pharmaceutical Society itself, may be led to perceive that, by subscribing to the Benevolent Fund, they would not be rendering a service to the Society, but to the great body of chemists and druggists to which they belong, and we cannot imagine any reasons that would be sufficient to deter them from taking part in that good work to the extent of their ability.

In urging this view of the matter upon the consideration of all members of the trade, it must also be pointed out that from the nature of the Fund, and by reason of the restricted application of it to registered chemists and druggists, it is only from that class that subscriptions can be looked for. There are certainly many subscribers and donors to the Fund who do not hold that position, but are in other ways more or less connected with the drug trade, such as wholesale drug houses and other firms, but that does not in any degree lessen what may be termed the obligation of individual members of the trade to aid in supporting an institution that is for the good of the body to which they belong. A reference to the work that is now being done by the Benevolent Fund will furnish additional reasons for their subscribing. According to a circular that is in course of being issued it appears that there are now forty-nine annuitants, who receive on the aggregate nearly seventeen hundred pounds a year. To meet this expenditure in annuities the Fund has only a permanent income of £780, and the annual subscriptions are relied upon to make up the remainder. In addition to the annuities a considerable expenditure is incurred every year in grants for temporary relief, no less than six hundred and thirty pounds having been spent in this way during the past year. Comparing these disbursements with those of ten years ago, it appears that the number of annuitants has actually been more than doubled, and that there is in this circumstance evidence that the Fund is growing in its power of affording relief. But at the same time the claims upon it are increasing every year, and there is every reason for seeking to augment its capability of being useful.

Those who are in the habit of asking what use the Pharmaceutical Society is to the trade or to themselves individually may, we think, take cognizance of the work that has been done by the Benevolent Fund, which it has instituted and thrown open to all with the result of finding that in this direction there is a satisfactory answer to their question. The long list of annuitants who have received assistance by this means ought to convince them, if nothing else would do so, that the Society has been of benefit, and when it is remembered that the Council has repeatedly added to the invested capital of the Fund by liberal grants, it will be evident that there has been a desire to extend to the entire body of chemists and druggists the advantages that such a

corporate representative body can confer. If there be any failure to realize all that might have been desired, it will be worth consideration whether the causes of that failure are not to be sought elsewhere than in the Society itself.

The festival that is to be held this year with the special object of securing an increase in the capabilities of the Fund will offer a favourable opportunity for new subscribers to contribute to its resources. The dinner will take the place of the annual dinner that it has now become customary to hold on the evening before the annual meeting of the Society, and it will be held at the Freemasons' Tavern on the 17th of May next. We trust that the local secretaries throughout the country will take advantage of this occasion to impress upon their neighbours the merits of the Benevolent Fund and the claims it has upon their support, and, also, that they will be able to send in such good lists of subscriptions and donations as to make the present year a notable epoch in the history of the Benevolent Fund.

REDWOOD TESTIMONIAL FUND.

A MEETING of the Executive Committee was held on Wednesday, March 23, the President of the Pharmaceutical Society in the chair. Professor DUNSTAN, on behalf of the Sub-Committee, submitted a draft deed of trust by which the sum of six hundred pounds, in the form of Indian Railway Guaranteed Stock, is to be transferred to the Pharmaceutical Society for the endowment of a REDWOOD Scholarship, to be held in connection with the School of Pharmacy of the Pharmaceutical Society; the award to be made on the results of an examination, the subjects of which, as well as the time of the award, to be determined by the Council of the Pharmaceutical Society. It is probable that the scholarship will be awarded annually, and will be tenable for one year, the subjects of the examination being for the present the same as those of the JACOB BELL Memorial Scholarships. After a short discussion, the draft deed was unanimously approved, and the Treasurer was directed to proceed with the investment. It was also reported that the well-known portrait painter, Mr. SYDNEY HODGES, had accepted the commission for a portrait of Professor REDWOOD, and that the picture would in all probability be ready for presentation to the Society next May.

The announcement recently made (before, p. 722) of the issue of a Japanese Pharmacopœia lends special interest to a note on Ancient Japanese Pharmacology, by Dr. Whitney, in the current number of the *Sei-i-Kwai Medical Journal*. From this it appears that since a period nearly contemporary with the commencement of the Christian era the practice of medicine in Japan has been largely influenced from China, though the Japanese materia medica would seem to have been more limited than that of the Celestials, and confined more closely to the vegetable kingdom. Some of the remedies were as peculiar in their nomenclature as in their composition. One which was known as "*Shin-sen-chinja-guwah*," or "the heavenly mountain sprite chinja pellets," consisted of myrrh, dragon's blood, musk, cinnabar, elecampane and liquorice, reduced to powder, mixed well and made into small pellets, one of which was a dose, to be masticated well and washed down with a decoction of ginger and salt. Another contained twenty-three ingredients, including cinnamon, cubebs, *Ranunculus sceleratus*, *Aconitum Fischeri*, *Fœniculum vulgare*, *Aquilaria Agallochum*, *Alisma Plantogo*, *Pachyma Cocos* and another fungus, and a chrysalis, which were powdered, made into paste with an alcoholic liquor and rolled into pellets. The applications of this specimen of polypharmacy answered in number and diversity to its constituents, for it was used in the treatment of kidney diseases, "five kinds of consumption of the lungs," seven kinds of fevers, spasm of the smaller intestines, pains in the four extremities, jaundice, dryness of tongue or lips, amblyopia, tinnitus aurium, palpitation of the heart, mental excitement, nightmare, mental prostration, excess of joy or anger, melancholy, dropsy, paralysis, urinary troubles, impotence, eczema, and a number of other complaints.

* * *

On Friday, the 18th inst., the House of Lords considered the Pharmacy Acts Amendment Bill in Committee, when the Earl of Milltown moved the insertion of the words "authorized on that behalf" after the word "Council" in clause 2, and in clause 4 the insertion of the word "eight" after "eighty," which was agreed to. On Thursday the Bill was read a third time and passed.

* * *

Last July we called attention to the proposal to commemorate the centenary of M. Chevreul by the striking of a medal. We have now much pleasure in stating that this has been carried out, and that a bronze copy of the medal has been sent to each of the subscribers by the President of the Committee which undertook the work. The medal was executed by M. Roty, and bears an excellent portrait of M. Chevreul on the obverse, while on the reverse there is an allegorical figure representing the youth of France presenting a laurel wreath to M. Chevreul as the doyen des étudiants.

* * *

We have been requested by Messrs. Burroughs and Wellcome to state that, as no copies of Professor Remington's 'Practice of Pharmacy' were to be obtained in this country, they have now undertaken to supply them. A review of this work appeared in the *Pharmaceutical Journal* of 24th June last.

* * *

We regret to have to record the deaths of two more annuitants on the Benevolent Fund, Mr. Thomas Townson, who was elected in 1878, and Mr. John Richard Collins, who was elected in 1885.

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The annual meeting of the Chemical Society will take place on Wednesday, the 30th inst.

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The next meeting of the School of Pharmacy Students' Association will take place on Thursday, March 31, when Mr. Arthur Smith will read a paper on "The Officinal Succi," and a Report on Inorganic Chemistry will be given by Mr. L. W. Hawkins.

* * *

On Wednesday next, the 30th inst., a meeting of the Chemists' Assistants' Association will be held at the rooms, Great Russell Street, when the papers read will be a "Note on Ipecacuanha Wine," by Mr. F. C. J. Bird; and a "Note on Water Softeners," by Mr. E. J. Millard.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN EDINBURGH.

The second Evening Meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday evening, March 16, at 8.30. Mr. H. Bellyse Baildon, B.A., F.R.S.E., Chairman of the Executive of the North British Branch, in the chair.

The minutes of last meeting having been read and approved, the following papers were read:—

Note on a Theory of Emulsification.

BY WILLIAM GILMOUR.

The paper is printed on p. 781, and gave rise to the following discussion :—

Mr. Nesbit (Portobello) said he believed the explanation of the theory of stirring certain emulsions in one direction, brought forward by Mr. Gilmour, was the correct one. He thought this practice had arisen mainly in connection with the making of salad creams, in which no emulsifying agent was used, and in such cases it might be advantageous, but in making emulsions with gum arabic he had found it quite immaterial in what direction the stirring took place.

The Chairman said he did not quite understand from the paper that Mr. Gilmour had got to the bottom of the subject, which was capable of being worked out still further. He suggested that the finished emulsion might be examined by a microscope as to whether it consisted of globules of one liquid coated with the other, or of globules of one floating in a body of the other.

Mr. Gilmour replied that he had not gone very fully into the subject. In connection with the culinary emulsions referred to by Mr. Nesbit it would occur to most people that in the ordinary egg-switch we have a good illustration of emulsification, which exploded the stirring in one direction idea, because in this case you have simultaneous motion in exactly opposite directions. A little consideration, however, would show that although there is simultaneous motion in two opposite directions the moving particles from each current constantly meet in the centre, and perfect harmony in the mixing is preserved.

Practical Remarks on Pearl Coating of Pills.

BY WILLIAM GILMOUR.

The paper is printed on p. 781, and gave rise to the following discussion :—

The Chairman remarked that he had recently met with two instances in which saccharine had acted as an emetic, and he thought it would require to be thoroughly tested before being used for such a purpose as pill coating.

Mr. Ainslie said he had found that coating the pills with a solution of tolu in chloroform, and dusting on a little French chalk answered all the purpose.

Mr. Nesbit thought the substitution of resin of scammony for the gum resin in such a pill as colocynth was not an improvement, as such pills were more liable to pit from the absence of the gum. He did not approve of pearl coating. The objection to tolu coating on account of its insolubility was groundless, as the coating immediately bursts on placing the pill in water. He had seen an American Blaud's pill, the coating of which was almost insoluble.

Dr. Clark remarked that in his experience he had not been able to gelatin coat Blaud's pills satisfactorily. He had always found, on cutting up such pills, that they were of a bright red colour inside, showing that the iron was in an unsatisfactory state.

Mr. Boa disapproved of pearl coating, especially in such cases as Blaud's pills, where the swallowing of such large quantities of an insoluble powder like French chalk might give rise to the formation of dangerous intestinal concretions.

Note on Lime Water.

BY J. I. FRASER.

The paper is printed on p. 782, and gave rise to the following discussion :—

Mr. Maben (Hawick), said he had listened with much interest to Mr. Fraser's paper. The results corresponded pretty closely to those he had himself obtained in a similar inquiry several years ago. Latterly he had adopted the practice of having his lime water estimated from time to time and found it sometimes above and sometimes below the official standard. He did not think it was absolutely necessary to have freshly slaked lime each time, provided the stock of slaked lime was carefully preserved from the atmosphere. There was no difficulty in having lime water of full B.P. strength.

Mr. Nesbit said he agreed with Mr. Maben that it was not necessary to slake the lime each time, but fresh lime should be used every time the jar is filled up. It was also desirable to estimate the lime water occasionally.

Mr. Ainslie said it was very important that lime water should be of full strength, and it might be a very serious matter if some of the samples referred to in the paper were supplied to the order of a medical practitioner.

Dr. Clark remarked that sample J was about the strength of ordinary Edinburgh water. Mr. Fraser's paper emphasized the necessity for a frequent examination of stock on the part of pharmacists.

Note on the Corrosion of a Zinc Refrigerator by Ammonium Chloride and Potassium Nitrate.

BY J. H. FISHER.

The paper is printed on p. 783, and gave rise to the following discussion :—

Mr. Fisher showed a zinc vessel completely destroyed by exposure for two hours to a hot solution of ammonium chloride and potassium nitrate.

Mr. Gilmour said he had had some experience of this action, from the fact that he had a very intelligent plumber for a neighbour who had sometimes consulted him regarding troubles of this kind. He had seen evidence of the powerful effects of NH_4Cl on metallic zinc.

Mr. Dott said the paper was a very interesting one. It was known that ammonium chloride acted readily on many metals. The action was probably fundamentally electrical, due to presence of more than one metal. He did not think pure zinc would be acted on in the way described. He had doubts about the formation of NH_2ZnCl. He objected to the use of the term "univalent" mercury. There was no evidence that mercury was so.

Mr. Fraser said he had recently seen a zinc percolator which had rapidly become corroded. On examination it was found to be bound with copper, and he thought electrical action had a good deal to do with the corrosion in all cases.

Dr. Clark mentioned that he had recently had some zinc trays placed in his conservatory. These had been filled with ordinary furnace slag, and he observed that they very soon became completely covered with a white substance which he took to be zinc hydrate.

Mr. Nesbit stated that in many places in the colonies the domestic water supply was derived from galvanized iron roofs. He thought that must be a dangerous practice in view of the statements made in Mr. Fisher's paper, and these facts ought to be made well known to the public.

Mr. Shand stated that he had been working recently with pure zinc prepared by electrolysis. He found it to be soluble in a solution of ammonium oxalate, and thought it would also be soluble in a solution of ammonium chloride. With regard to the amine, said to be formed in this reaction, Roscoe and Schorlemmer mentioned a zinc amine having the formula $Zn(NH_2)_2$, and the compound referred to in the paper might be formed

from this by substitution of one atom of chlorine for one NH_2 radicle.

The Chairman remarked that they were much gratified to see a provincial member coming so far to contribute to their evening meetings, aud they would be very glad to see Mr. Fisher on any future occasion.

Syrup of Tolu by a New Process.

BY FREDERICK STEPHENSON.

The paper is printed on p. 785, and gave rise to the following discussion :—

Mr. Smith suggested that the syrup might be clarified by filtration through pumice stone.

Dr. Clark said the gist of Mr. Stephenson's paper was not in the making of a clear syrup, but in the avoidance of loss of aroma. This object might be attained by the use of an inverted condenser, and this would allow any more thorough exhaustion of the balsam which might be secured by the aid of heat. He had observed that some tolu syrups, specially those made from a liquor, though they had a cinnamic odour at first, gradually changed and acquired a benzoic odour. It would be interesting to know what was the cause of this change.

Mr. Boa said this paper was one of the most interesting he had heard at these meetings for some time. He could confirm what was said as to the loss of aroma in the ordinary process. Some time ago, the process had been conducted in his front shop, and it was found necessary to open the door and have the place thoroughly ventilated. He felt inclined to adopt the suggestion made by Mr. Stephenson.

Mr. Fraser said many of the commercial liquors contained excess of benzoic and cinnamic acid from the addition of spirit to the liquor before it was thoroughly cold.

Mr. Nesbit said he had frequently observed a marked benzine odour in empty bottles which had contained syrup of tolu. He thought this might possibly be due to the use of magnesia in clarifying some of the commercial liquors.

Presence of Manganese in Chlorinated Lime.

BY ALEXANDER SHAND.

The paper is printed on p. 785, and gave rise to the following discussion :—

Mr. Dott remembered that, as a student, when following the process of Fresenius for separation of iron, aluminum, chromium, zinc and manganese, by means of $BaCO_3$ and hypochlorous acid, he was warned about the development of a pink colour due to manganese. He had observed the pink colour produced in chlorinated lime solutions when heated, and attributed it to the presence of manganese which he thought was a very likely thing. The source of the manganese was no doubt the chlorine generator used in making the chlorinated lime, in which MnO_2 and HCl are used.

Mr. Baker said manganese was a frequent constituent of ordinary limestone, and that might perhaps account for its presence in the chlorinated lime.

The Chairman then proposed a hearty vote of thanks to the authors of the papers, which was unanimously passed with acclamation.

Attention was then directed to some specimens and donations which had been placed on the table. These included various drugs presented by Messrs. Christy and Co., London, and cinchona barks and caliche, a native sodium nitrate, containing considerable quantities of iodate, from Bolivia, presented by Messrs. T. and H. Smith and Co. Among the specimens was a peculiar fungus growing on a quantity of exhausted opium, from Messrs. J. F. Macfarlan and Co. It was thought to be a species of *Mucor* or *Pilobolus*, but had not yet been certainly identified. There was also shown a squill bulb which had been standing in a jar in the museum for many years, and which had recently begun to show signs of life and growth.

The Chairman intimated that it was proposed to have the next meeting on April 13. Then Mr. Thompson will contribute a paper on "Gelatin Coating of Pills," and will show a specially-designed machine in operation.

The meeting then closed.

Provincial Transactions.

REGISTERED CHEMISTS' TRADE ASSOCIATION OF LIVERPOOL.

The annual supper in connection with this Association took place on Thursday, the 17th inst., at the Merchants' Dining Rooms, 5, Castle Street. The attendance was large and representative.

Mr. Councillor Joseph Woodcock, President of the Association, occupied the chair; the vice-chair being occupied by Mr. B. Dickins, Vice-President.

After the usual loyal toasts, the President proposed the "Registered Chemists' Trade Association of Liverpool." In doing so, he said his duty was like proposing "Our Noble Selves," and it was on that ground he felt he was not called upon to say much in submitting the toast to them. He could not, however, let the occasion pass without offering a few words. Naturally their Association had not achieved as much good as they could desire, but they had to remember that associations, like individuals, could not command success. The Association had done as much as it fairly could to redress grievances and to consider complaints; it had done its utmost to foster and encourage earlier closing and had cultivated a kindly feeling of sympathy and forbearance among its own members. Benevolently, the Association had assisted those who under fortune's frowns had fallen in need of pecuniary help, and it had busied itself in many ways in benefiting the members in their entirety, and if they had no other record of its existence than the Liverpool chemists' price list, they could point to that achievement as a lasting monument to its memory.

The toast was drunk amidst enthusiasm, and was acknowledged by Mr. John Bain, the Honorary Secretary, who appealed for more members to assist the Association in more thoroughly carrying on its useful work. He pointed out that, among other objects for which the Association was founded, were the taking cognizance of proposed legislation affecting chemists and assisting in the prevention and suppression of illegal trading, and to do this effectually it was necessary that the chemists of Liverpool should be a well organized body.

Mr. B. Dickins proposed "The Liverpool Chemists' Association," which was acknowledged by Mr. A. C. Abraham, F.C.S.

Mr. J. J. Smith proposed "The Pharmaceutical Society of Great Britain," and remarked that he never yet saw cause to ask what the Society was doing for them, as he considered it performed its functions satisfactorily.

Mr. Charles Symes, Ph.D., in acknowledging the toast, defended the Society from the unwarrantable attacks which were so frequently made upon it by those who themselves do nothing to assist in promoting its objects. He also spoke of the advantages which would accrue from the proposed curriculum, which would prove a valuable corrective to the present system of cramming.

Mr. F. J. Mackinlay, in proposing "The Chemists and Druggists' Trade Association of Great Britain," urged those present who were not members to join.

Mr. R. Parkinson, Local Secretary, in responding, hoped and believed the Association had many useful years before it.

Mr. W. T. Warhurst proposed "The Wholesale Trade," which was responded to by Mr. Edward Evans.

Mr. J. Hocken proposed the toast of "The President," and referred to the advantages the Association enjoyed in having so eminent a gentleman at its head. Mr

Woodcock's value was not only appreciated by the chemists of Liverpool but also by their fellow-citizens, and no one could be more indefatigable in the performance of his public duties as city councillor and as churchwarden.

The toast was drunk with musical honours, and suitably responded to by the President.

Mr. G. Alexander proposed "The Vice-President."

"Our Musical Friends," proposed by the President, was responded to by Mr. N. F. Burt.

A high-class musical programme was gone through, to the evident delight of those present, this portion of the entertainment being in the hands of a quartette party from the cathedral church of St. Peter, viz., Messrs. N. F. Burt, D. J. Davies, W. Dakin and E. Grime. Mr. Martin Schneider performed the duties of accompanist with skill. The recital "Mark Antony's Oration over the Dead Body of Julius Cæsar," and the laughable sketch "Facts Concerning Jay Gould," were rendered by Mr. H. Jackson in the acceptable manner for which he is so well known. The reunion was amongst the most successful yet held by the Association.

LEICESTER AND LEICESTERSHIRE CHEMISTS' ASSOCIATION.

An address, entitled "Hints to Students," was delivered by Mr. W. B. Clark, at the Old Town Hall, Leicester, on Friday evening, March 18. Mr. E. H. Butler presided.

The lecturer thanked the Council for the honour done him in selecting him to deliver the inaugural address to the members of the Association. He was very pleased to meet them once more and renew his former close connection with the students of pharmacy in Leicester. The first question was for the students to have a clear idea as to what they were called upon to fulfil. Some called the calling of pharmacy a trade, others a profession, and he thought they had a clear claim to the latter title if only on account of the high abilities that were required in carrying out the ordinary calling of pharmacists; a man could not lose his professional status by performing trade duties, for "all labour should bring honour with it." The important point for them was, how soon ought apprentices to be students? His answer was, from the first hour of apprenticeship. It was of great importance that they should pass the Preliminary examination before apprenticeship so that they could then give their whole time to the study of subjects connected with their future calling. There was no merit in this examination, it was merely a proof that a young man possessed the right kind of knowledge to fit him for his calling. It also gave the student, in the event of failure, an opportunity of turning his attention to other callings. The technical part of their business could be learnt during the ordinary routine of shop work; the theoretical and more important part would require them to work hard to acquire. He advised them not to take more than two subjects at a time; it was a mistake to take three or four, whilst the concentration of the mind on one subject was apt to cramp the intellect. It was a very wholesome rule for students to cultivate close friendship, to select some fellow-student so that they could question each other, compare notes, and by viewing subjects from different standpoints arrive at the truth. He strongly urged them not to forget those old principles which went so far to ensure success in life: strict conscientiousness, untiring industry, truth, carefulness, and scrupulous cleanliness. The lecturer then referred to the many points to be particularly studied with reference to their calling, the lists of the Pharmacopœia, the study of the synopsis, and the prospects of the trade in the future. He urged the pharmacists to cultivate a feeling of *esprit de corps*, to be united so that they might resist successfully any encroachment on their legitimate rights. He strongly advised the students to attend regularly the excellent classes now being held at the Association, and to acquire thoroughly that knowledge which would entitle them to the respect and confidence of the public.

Mr. Burford proposed a vote of thanks to the lecturer for his able and exhaustive lecture. This was seconded by Mr. Thirlby and carried.

Votes of thanks to the Chairman for presiding, and to the Mayor for the use of the hall brought the meeting to a close.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The tenth meeting of the ninth session was held in the Pharmaceutical Society's House, 36, York Place, Edinburgh, Mr. William Duncan, President, in the chair.

The minutes of last meeting having been read and approved, the Chairman called upon Mr. Hill to read a paper on—

Irish Pharmacy.

BY JAMES JACK, PH.C., CORK.

Mr. Jack began by stating that Ireland was to many a hot-bed of sorrows, but it was not so to the enterprising chemist, to whom it offered a fair field for the successful prosecution of his calling. He also mentioned that in Ireland, as contrasted with Scotland, the social position of the chemist was higher than that of the ordinary shopkeeper, and he was looked up to by the majority of the people as a man little inferior in skill and knowledge to members of the medical profession.

The Irish pharmacist took a pride in his shop, and spared neither pains nor expense to have it elegantly fitted with all the latest improvements. It was also the custom to make all B.P. preparations, with the exception of chloroform, ether and such like, on the premises, thus affording valuable opportunities to apprentices for acquiring a thorough practical knowledge of their profession.

Mr. Jack then dealt with his subject under the two heads of "Business (Retail and Dispensing)" and "The Requirements of the Irish Pharmaceutical Society." Irish retail trade was, he said, very mixed, many chemists apparently selling anything on which they could turn an honest penny. Proprietary articles were very common, each chemist having his own specialities. One objectionable feature was the universal practice of selling coated pills, nearly all of which were imported from England or America.

Mr. Jack then made the following remarks on dispensing:—"This, where possible, is conducted in a separate department, which has many advantages, chief of which are the quietness given to a dispenser, allowing of that attention to the compounding which is so requisite for a true rendering of the much hackneyed phrase, 'Prescriptions dispensed with the utmost care and accuracy,' and when separate books are kept, of making known the best paying part of the business. For convenience, let us follow a prescription in its wanderings from the time of being received until sent out ready for the patient. A recipe on being handed in is examined. The name of the party and address asked, whether to be sent or called for, time received, and a note of the medicine required, all written on a specially prepared docket. To prevent confusion or different orders getting mixed, a system of small trays has been introduced. On these a small spring is fixed which holds the individual recipe, and its accompanying docket till wanted. There are in the compounding room a senior and one or two assistant juniors, no apprentice being allowed within its sacred precincts. The senior, being in charge, receives from the counterman the tray and contents, which after perusal he assigns to its proper place to be dealt with in turn. Should it be a mixture containing salts in solution, the dispenser

invariably strains it through either well washed very fine tow or lint. This done, after corking and polishing, the bottle is placed on its tray and returned to his senior. It is immediately, where a third hand is kept, given to him. Being as a rule a good round penman he copies, writes labels, etc. This process gone through, it is once more returned to the senior, upon whom now devolves the responsible duty of checking dispenser, copy and label. He being accountable for any mistakes must have all his wits about him. Having satisfied himself that all is right, he affixes the label and then considers the necessity of adding such labels as 'Shake the Bottle' 'Caution,' 'Poison,' or 'Not to be taken.' The former is put on all mixtures where there is the slightest possibility of a deposit. Finally as a guarantee of having passed through his hands, he affixes a small check label with his initials. The cork having been carefully sealed by means of a spirit lamp flame, the bottle is now ready for wrapping. For this purpose paper of the finest quality is used either white or of a lilac tint.

"It is the custom that returned bottles should never be refilled, new ones being always substituted. This in itself prevents much waste of valuable time, which scraping off of dirty labels and washing old bottles entails on an assistant, a duty which can be easily undertaken by a message boy.

"To save his reputation by preventing as far as possible the occurrence of a mistake the chemist uses distinctive bottles for each kind of medicine. All liniments are dispensed in blue actinic fluted bottles, eye-washes in green or white according to the colour of the solution. Gargles are sent out in French rounds, mixture in squares. Pure white glass, though costing a little more than the ordinary dispensing bottles, is generally used. Drops are sent out in bottles with a small lip for convenience. This way of dispensing, besides being conducive to safety, simplifies the washing of returns; thus greasy liniments are easily distinguished from mixtures or eye-washes. It also makes it easy for the unsophisticated to recognize their application and gives no loop-hole of escape from blame should they by chance or otherwise take a dose of liniment instead of their mixture. Pills by prescription are usually silver coated, except for the very poor. Many may think such an amount of trouble and fuss needless, and that so many apparent complications only tend to the making of mistakes, but where the maximum of work is to be taken out of the minimum of assistants, the above system, from well-tried experiments, has proved the most complete; combining dexterity of manipulation with the utmost safety to all.

"The dispensary being entirely apart from the retail necessitates a complete stock of its own. This, however, does not need to be large but varied. A few dozen 2 ounce wide-mouthed stoppered bottles and a like number of 12 or 16 ounce narrow-mouthed bottles with recess labels, makes a tidy little place."

Mr. Jack then referred to the history, present position, and examination requirements of the Irish Pharmaceutical Society, and concluded an interesting and racy paper as follows:—"My little experience of Irish chemists has proved them to be gentlemen in all senses of the word. They meet you, if a stranger, with 'Welcome to Ireland,' and part, as all Irishmen do, with 'God bless ye.'"

The Chairman moved a cordial vote of thanks to their absent member, Mr. Jack, for his interesting and humorous paper.

In seconding the motion, which was passed with acclamation, Mr. Boa said he had had some experience of pharmacy in the North of Ireland, and could confirm much that had been said by Mr. Jack. The practice in the South appeared to correspond very closely to that in the North.

The Chairman then called upon Mr. A. R. Bennet to read a paper on:—

The Calamines of Commerce.

BY A. R. BENNET.

When I was asked at the commencement of the session to deliver a paper before this Association, I felt that I had not a subject in view which I could treat in a satisfactory manner; but our President coming to know of the difficulty suggested that I should make some experiments on a few commercial samples of calamine, and report the results, which I have much pleasure now in bringing before you.

Before I proceed further, perhaps it will not be out of place to refer briefly to the history of calamine. The word calamine is derived from the Latin *calamus*, a reed of corn, from the mineral being found in long reeds. Although we are only familiar behind the counter with one kind of calamine, which has a pinkish tint, and is usually in the state of a fine impalpable powder, yet there are two kinds known to mineralogists. The one is a silicate of zinc, which is found native in Cornwall among the rocks, and adds to the beauty of the surrounding district. The other is the impure carbonate of zinc B.P. with which we are all acquainted, and of which I am about to speak. It is found in various parts of England, and also in some places on the continent. It is hard, sometimes presents a greyish appearance, but more commonly a yellowish or reddish colour, has an earthy fracture, and is soluble with effervescence on the addition of acids, but frequently not at all, either because silicated calamine has been wrongly used in its preparation, in which case it is insoluble, or it has been roasted too strongly before being pulverized, and therefore does not effervesce. At the best it is a very impure substance, containing generally as impurities iron, lime, alumina, and various other earthy matters, as well as a large amount of sulphate of barium.

It is only used externally, and for that purpose it must be in the state of a very fine powder; the B.P. therefore directs that it should be calcined at an ordinary temperature, powdered and freed from gritty particles by elutriation.

During the process of calcining, if too strong heat has been applied, the CO_2, if not wholly, is to a large extent driven off, hence the non-effervescence on the addition of acids, and this is also the reason for the official direction to use an ordinary temperature.

I tested four samples all got from various sources in town, and now report the following results:—

Sample No. I.—This was a pinkish coloured powder, and in the state of very fine division, and had the physical appearance of ordinary calamine as seen in shops. One hundred grains of this sample was carefully weighed and treated with HCl and HNO_3, and subsequently boiled.

The soluble matter was then filtered off, and the residue, when dried, was found to weigh 72 grains. It was observed that on the addition of acid the sample did not effervesce, showing that the CO_2 had been driven off by excessive heat during the calcining process, or silicated calamine had been wrongly used in preparing it.

The filtrate was treated with H_2S, but no precipitate was thrown down, showing the absence of copper, lead, etc.; it was then made alkaline with NH_4Cl and NH_4HO, and NH_4HS was added. This threw down an abundant precipitate, which was collected and washed. The precipitate was next dissolved in HCl, afterwards adding a few drops of HNO_3 to convert any iron that might be present into the ferric state, and then adding AmHO to form the Fe_26HO, and dissolve out any zinc. This precipitate was treated with KHO to dissolve out any alumina as Al_26HO, and the alkaline solution of the Al_26HO was neutralized by HCl and treated with NH_4HO, which threw down a white gelatinous precipitate of Al_26HO. This was collected, washed, ignited and found to weigh 12 grs. Al_2O_3.

The residue consisting of Fe_26HO was dried, ignited, and found to weigh 2·5 grs. Fe_2O_3.

The NH_4HO solution was treated with a current of

H_2S, and an abundant precipitate of ZnS was thrown down. It was collected, washed and dried, and found to weigh 5·5 grs. ZnS corresponding to about 4·5 grs. ZnO.

The filtrate from the NH_4HS precipitate was treated with $(NH_4)_2CO_3$ which threw down a white precipitate. This was collected, dried and ignited, and found to weigh 5·5 grs. CaO.

Na_2HPO_4 added to the $(NH_4)_2CO_3$ filtrate gave no precipitate, indicating absence of magnesia.

The residue weighing 72 grains I supposed to be a mixture of sulphate of barium and silica. It was fused in a crucible with Na_2CO_3, so as to produce double decomposition and form Na_2SO_4, Na_4SiO_4, and $BaCO_3$.

The fused mass was treated with water to dissolve the Na_4SiO_4, and filtered from the $BaCO_3$ which is insoluble in water. The filtrate was treated with HCl which formed NaCl, soluble in water and precipitated the SiO_2. The SiO_2 was dried, ignited, and found to weigh 50·5 grs.

The $BaCO_3$ which was left behind on the filter was dissolved in HCl, and H_2SO_4 was added to the filtrate. This treatment threw down the barium as the insoluble sulphate, which, on being thoroughly washed with hot water, dried and ignited, was found to weigh 11·5 grs. $BaSO_4$

Sample No. II.—This presented a greyish appearance, and was also in the state of a very fine powder. On the addition of HCl and HNO_3 it effervesced briskly and left no residue. On passing H_2S nothing was thrown down, showing the absence of lead, copper, etc., but on making alkaline with NH_4Cl, and NH_4HO, and adding NH_4HS an abundant precipitate was thrown down. This precipitate was collected, washed, dissolved in HCl with a few drops of NHO_3 in the same manner as the first, and then treated with excess of NH_4HO, filtered and the residue treated with KHO. The KHO solution was filtered, neutralized and NH_4NO added, which threw down the Al_2 6 HO and this was collected, dried and ignited—the residue weighing 10·4 grs. Al_2O_3.

The residue of the KHO solution consisting of Fe_2 6 HO was washed, dried, ignited, and found to weigh 12 grs. Fe_2O_3 A current of H_2S was passed through the NH_4HO solution, and an abundant white precipitate was thrown down. The precipitate was collected, washed and dried. It weighed 98 grs. ZnS corresponding to 81·8 grs. ZnO.

The filtrate from the NH_4HS precipitate was treated with $(NH_4)_2CO_3$ and nothing was thrown down, showing the absence of lime. It was then treated with Na_2HPO_4 and nothing was thrown down, showing absence of magnesia.

Sample No. III.—This was a small portion of the native ore, and, from the results obtained, I think it must have been a fairly good specimen. On treating it with HCl and HNO_3 it effervesced briskly and dissolved entirely. On adding H_2S nothing was thrown down, but on adding NH_4Cl, NH_4HO, and NH_4HS an abundant precipitate was thrown down. The precipitate was collected, washed and dissolved in HCl with a few drops of HNO_3 and then treated with NH_4HO in the same manner as the foregoing. The residue of the NH_4HO solution was treated with KHO and the filtrate neutralized and treated with NH_4HO which threw down no precipitate, showing the absence of alumina.

The residue of the KHO solution consisting of $Fe_2$6HO was dried, ignited, and found to weigh 18 grs. Fe_2O_3. A current of H_2S was passed into the NH_4HO solution, and an abundant precipitate of ZnS was thrown down, which, when collected, washed and dried, weighed 79 grs. ZnS corresponding to 65·9 ZnO.

On adding $(NH_4)_2CO_3$ to the NH_4HS filtrate no precipitate was thrown down, showing the absence of lime. Na_2HPO_4 when added threw down no precipitate, showing absence of magnesia.

Sample No. IV.—This sample is rather interesting from the fact of its forming part of a wholesale order. An order was received for 1lb. calamine, and an article at 5*s.* 6*d.* per lb. was sent, but it was returned, saying that the calamine wanted was the kind at 2*d.* per lb. It had the physical appearance of ordinary calamine, but on drawing a spatula carefully over it particles of Fe_2O_3 were observed, as if it had not been thoroughly incorporated. On putting a few grains under the microscope the particles of Fe_2O_3 were easily observed.

I proceeded as in the other cases. I dissolved as much as possible with boiling HCl, and HNO_3, and filtered. The residue in this case, after being washed and dried like the others, weighed 84 grs.

The filtrate yielded nothing to H_2S, but a copious precipitate was thrown down with NH_4Cl, NH_4HO, and NH_4HS. This was collected and washed, dissolved in HCl with a few drops of HNO_3, and NH_4HO added, then filtered. The filtrate was treated by a current of H_2S, but nothing came down, showing the absence of zinc. The residue was treated with excess of KHO, and the filtrate was neutralized with HCl and NH_4HO added, but nothing was thrown down, showing absence of alumina.

The residue of the KHO solution when ignited weighed 12·5 grs. Fe_2O_3.

The residue of the original solution was fused in a crucible with Na_2CO_3, and the fused mass treated with water filtered, and the filtrate treated with HCl, but nothing was thrown down, showing the absence of silica.

The residue on the filter was dissolved in HCl, and the filtrate treated with $HgSO_4$ to throw down the barium as $BaSO_4$. This when dried and ignited weighed 84 grains of $BaSO_4$.

The results are tabulated as follows :—

	1.	2.	3.	4.
Al_2O_3 . . .	12	10·4	None	None
Fe_2O_3 . . .	2·5	18	12	12·5
ZnO	4·5	65·9	81·8	None
CaO	5·5	None	None	2·5
SiO_2	60·5	None	None	None
$BaSO_4$ . . .	11·5	None	None	84
Loss	3·5	5·7	6·2	1
	100·0	100·0	100·0	100·0

From these results I have come to the conclusion that the brightest coloured specimens of calamine are the worst, while the grey coloured specimens are the best. I have also been a little surprised to find that a calamine similar to that marked No. 4, appears to be very largely used in pharmacy, and it is quite the exception to meet with a sample corresponding, even approximately, to the official characters and tests.

The Chairman, in moving a vote of thanks to Mr. Bennet, stated that Mr. Martindale described calamine as an oxide of zinc. He had himself had experience of calamine made by adding Armenian bole to zinc oxide, but he did not think that was what was intended by the Pharmacopœia.

Mr. Lunan, in seconding the vote of thanks, said that it was clear that in many cases where calamine was ordered in cooling lotions, the patient would be applying sulphate of barium and that was certainly not the intention of the prescriber. He had observed that since the reintroduction of calamine to the Pharmacopœia, manufacturers had attempted to accommodate themselves to the new conditions, and fine-coloured calamines, soluble in acids, could be had, but whether these were native calamine or an artificial imitation was open to doubt. He was surprised at the apparent small percentage of CO_2 even in the best samples examined by Mr. Bennet and that seemed to indicate that the zinc really existed in the mineral as oxide to a considerable extent.

Mr. Hill remarked that a calamine which produced a

green colour when shaken off a spatula into a Bunsen flame and gave red streaks when a spatula was drawn firmly over it on a sheet of white paper might be certainly regarded as spurious, being a mixture of ferric oxide and heavy spar.

The vote of thanks having been heartily awarded the meeting was closed.

Proceedings of Societies in London.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, March 17, Mr. E. J. Woolley in the chair.

The proceedings commenced with some remarks by the Secretary, Mr. F. W. Short, on the difficulties experienced and the errors most commonly fallen into by beginners in analysis. The discussion of the subject was continued by the Chairman, Miss Munro, Messrs. White, Eastes, Thomas, Bird and Daintree.

Mr. F. J. Yeatman then read a Report on "Physics," the subject of which was "Magneto-Electric and Dynamo-Electric Machines." The author first dealt briefly with the general phenomena bearing on the subject and the laws governing them, describing more particularly the solenoid, and showing its resemblance to the magnet; this led to the magnetization of an iron core by a current passing round it, and the induction of a current in a coil of wire by the insertion or withdrawal of a magnet. Next, the effect of a smaller coil of wire with a current alternately increased and diminished, replacing the magnet, was considered. From this the author proceeded to trace the development of the magneto- and dynamo-machine from its first crude conception of a horse-shoe magnet revolving its poles in front of a pair of bobbins, to its present state. Many typical machines were described, and special reference made to the Siemens and Gramme armatures. The report was illustrated by means of a small magneto-electric machine, and gave rise to a discussion in which the Chairman, Secretary, Messrs. Bird and White joined.

The meeting then adjourned.

CHEMICAL SOCIETY,

At a meeting of the Chemical Society on Thursday, March 17, Dr. Hugo Müller, F.R.S., President, in the chair, several certificates were read for the first time, and the following were elected Fellows of the Society :—Messrs. H. G. Colman, J. T. Cundall, A. J. Evans, A. Harden, W. Houlding, T. H. Redwood, G. Robertson, W. H. Stanger, P. T. O'Sullivan.

The following papers were read :—

The Action of Heat on Nitrogen Peroxide. By Dr. A. Richardson, University College, Bristol.—The dissociation of nitrogen peroxide has been investigated by Deville and Troost and other experimenters at temperatures between $-12°$ and 180° ; and it has been shown that while at low temperatures the molecule of the substance is represented by the formula N_2O_4, dissociation into nitrogen dioxide, NO_2, takes place with rise of temperature, being complete at 140°. Experiments have been made by the author to determine the change which takes place at temperatures above 140°. On heating the peroxide at about 500°, the gas becomes nearly colourless, and is found to consist of nitric oxide and oxygen : the presence of the former being indicated by the formation of the dark blue liquid which results from the interaction of nitric oxide with nitrogen peroxide when the gas is condensed ; and the presence of oxygen being demonstrated by the rekindling of a glowing match. At a temperature at which decomposition is complete, the change would be represented by the equation $2NO_2 = 2NO + O_2$; the vapour density of the dioxide being 23, that of the product is 15·5. On determining the density of the gas at temperatures between 130° and 500°, the numbers obtained were in agreement with the formula NO_2 at 140°, but as the temperature rose they more and more nearly approached that corresponding to complete dissociation. The curve representing the density of the gas at different temperatures shows that the decomposition of N_2O_4 into NO_2 is complete at 140°, and is immediately succeeded by the further dissociation of nitrogren dioxide into nitric oxide and oxygen. The form of the curve is that usually exhibited by dissociating substances, the change of density being most rapid at the temperature at which half the total number of molecules of the original substance are decomposed.

Supersaturation of Salt Solutions. By W. W. J. Nicol, M.A., D.Sc.—This paper contains an account of experiments on the physical constants of supersaturated and dilute salt solutions. The solutions were examined in two ways : 1st, concentration constant and temperature varying ; 2nd, temperature constant and concentration varying ; in this was it way possible to pass from dilute to supersaturated solutions, and to examine the change in the various physical constants. The electric conductivity, specific viscosity and rate of expansion were examined by the first method. The specific vicosity and density by the second. In every case it was found that the curve corresponding to the non-saturated solutions was perfectly continuous with that for the supersaturated solutions. From this the author concludes that the constitution of dilute, saturated and supersaturated solutions is the same. Supersaturation is explained by the hypothesis that the substance in solution is not the same as that which crystallizes out. A supersaturated solution of sodium thiosulphate deposited crystals of the composition $Na_2S_2O_3,H_2O$ when evaporated *in vacuo*, showing that the solution does not contain the pentahydrate. The author believes that the salt in solution is combined with the whole of the water, an opinion based on his experiments on vapour-pressures and molecular volumes. Colour changes in solution are not, he believes, due to hydration, but to rearrangements of the salt molecule similar to that which occurs in the case of chromium sulphate.

The Formation of γ-Naphthalenesulphonic Acid by means of Sulphuric Anhydride and on γ-Dihydroxynaphthalene. By Henry E. Armstrong and W. P. Wynne, B.Sc.

α-Cyanonaphthalenesulphonic Acid. By Henry E. Armstrong and S. Williamson.

Addendum to Paper entitled An Explanation of the Laws which govern Substitution in the case of Benzenoid Compounds. By Henry E. Armstrong.

The Transformation of Citric Acid into Pyridine-derivatives, and on the Constitution of Pyridine. By S. Ruhemann, Ph.D., Jacksonian Demonstrator in the University of Cambridge.—Hofmann and Behrmann have shown that citramide is converted by heating with sulphuric acid into citrazinic acid, the dihydroxypyridinecarboxylic acid in which both hydroxyls are in ortho-positions to the nitrogen-atom, the carboxyl being in the para-position. The author finds that the formation of the pyridine-derivative takes place even at ordinary temperatures if ethylic aceto-citrate be mixed with strong aqueous ammonia and the mixture allowed to stand several days ; dilute chlorhydric acid then precipitates citrazinamide. The production of a pyridine-derivative in this manner is a strong argument, he thinks, in favour of Riedel's contention that the nitrogen-atom of pyridine is in connection with the carbon atom which relatively to it is in the para-position ; and in further support of this view he states that no condensation takes place if methylamine be substituted for ammonia, there being in this case no available hydrogen-atom associated with the nitrogen-atom to separate with the hydroxyl and thus permit of the union of the nitrogen-atom with the para-carbon-atom. Incidentally it is mentioned

as an indication of the mobility of the acetyl-group that if ethylic aceto-citrate be treated with phenyl hydrazine, the acetyl-derivative of the latter is formed; ethylic aceto-malate and diacetotartrate behave similarly.

Silver containing Bismuth. By WILLIAM GOWLAND, A.R.S.M., Chemist and Assayer of the Imperial Mint, Osaka, Japan, and YOSHIMASA KOGA, Assistant Assayer.—An account is given of assays and metallurgical experiments made with the object of determining the effects produced by the presence of small quantities of bismuth on the ductility of silver, and on the uniformity of composition of silver bullion when in ingots of the form and size ordinarily met with in commerce. It is found: α. That when silver is obtained from copper containing bismuth by the liquation process with subsequent cupellation of the argentiferous lead, it contains part of the bismuth which was present in the copper; β. That this silver is brittle even when containing bismuth in but small amounts; γ. That ingots of such silver are not uniform in composition throughout their mass, the parts which have solidified last being richer in silver than the others; and δ. That when coinage bars of 900° millesimal fineness are prepared from it, they cannot be rolled without special treatment, and even then are hard and unsuitable for mintage.

Obituary.

Notice has been received of the death of the following:—

On the 14th of March, Mr. William Henry Howlett, Chemist and Druggist, Edward Street, Bethnal Green Road, E. Aged 60 years.

On the 14th of March, suddenly, at 52, Woodstock Road, Finsbury Park, N., Mr. William Sheehan, jun. Aged 27 years.

On the 19th of March, Mr. Richard Weatherill Duck, Chemist and Druggist, Bute Docks, Cardiff. Aged 48 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE BENEVOLENT FUND.

Sir,—In reference to a letter signed by a Mr. H. J. Church, headed "The Benevolent Fund: A Suggestion," I venture, whilst quite agreeing with the writer in his idea as to a movement to celebrate the jubilee year of Her Gracious Majesty's reign, to suggest that, whereas the advantages to be derived from the Benevolent Fund are as at present sufficiently liberal, a scheme by which presentations to Christ's Hospital or the Royal St. Anne's School might be obtained would be of more real assistance to the profession at large.

I may add that in making the suggestion I have no personal interest to serve, as I have no children to plead for.

Peckham Rye. C. H. SNELL.

THE FUTURE OF PHARMACY.

Sir,—A "*tu quoque*" answer is always very unsatisfactory; nevertheless, I feel I must, in justice to myself, trespass upon your courtesy and the indulgence of your readers, whilst I reply to criticisms of our worthy Honorary Secretary and also of my esteemed friend, Mr. H. Kemp. I would, however, first of all premise that a perusal of the two letters would scarcely endorse the impression conveyed by Mr. Woolley's remarks in Council, viz., that Manchester pharmacists were in favour of the Bill. Mr. Benger says several (himself amongst the number) were opposed to it. Mr. Kemp conveys the idea that a very large minority were opposed to the Bill; will Mr. Kemp say that those gentlemen who "formed more than half," *i.e.*, and who numbered, I am told, considerably under twenty, would arrogate to themselves the right to speak for the whole body of Manchester chemists? At all events, the most I can gather from Mr. Kemp's letter is that only "more than half" of those present cordially endorse the Bill. Why does Mr. Benger, the most scientific pharmacist we have, and an ex-examiner, to boot, continue the old-fashioned system of vulgar fractions? Perhaps the large number of cyphers necessary after the decimal point startled him. Well, certainly ·00001 would not look well concerning a meeting supposed to represent the whole trade of Manchester. However, of this Mr. Benger may rest satisfied, that those who know our courteous and genial Hon. Sec. would certainly not assign any fraction to him, but a very large whole number, one which would beyond all doubt bury the total far beyond the sum requisite to do away with any vulgar or other fraction. In reply to Mr. Benger's last paragraph, will he accept my assurance that, of the members of the Association who live in this district, the percentage opposed to the Bill is not ninety-nine but exactly one hundred. One word in reply to my friend Mr. Kemp. His letter not only "invites," but absolutely demands an emphatic denial. Mr. Kemp's excessive innate bashfulness precludes him acknowledging his position in the trade. I can tell you, Sir, that by his neighbours Mr. Kemp is looked upon as an aristocrat of the aristocrats, in fact the chiefest among ten thousand; his last paragraph is so utterly at variance with his world-wide reputation for accuracy, that I can scarcely imagine the conditions under which it was written, except, perhaps, that his junior apprentice in his (Mr. Kemp's) temporary absence has written part of it for him. I never said, either in the meeting or out of it, that I would open the discussion; I certainly suggested the subject at the December meeting, but if nothing else had prevented me, my native modesty would have effectually hindered my proposing to inflict myself a second time in six months. I knew nothing at all about the meeting until three or four days before, when Mr. Benger wrote me to say that he had put me down to open the discussion; but an important meeting of the Council of the Microscopical Society, prevented me (as I informed Mr. Benger) being present, otherwise, no doubt, I should have been there. Mr. Kemp, however, seems to be unaware of the fact that by staying away and destroying the truly representative character of a meeting, an opposition may perform its duties perhaps better than by attending. Such, however, was not my idea. Surely, Sir, a Bill that has the support of only 10 per cent. of the trade and one trade journal, is opposed by the whole of the Council of the Society, and vigorously denounced by almost every journal and newspaper of any importance throughout the whole country, a Bill which even a many of its supporters admit is built on a rotten basis, surely a Bill like this can confer very little benefit on the drug trade. In conclusion, can you, Sir, or any of your correspondents, who are well versed in psychology, explain how it is that when the Council (composed of men thoroughly conversant with the drug trade, whose sole interest it is to look after our best interests) attempt to bind us, even with silken cords, there is such a howl of rage; whilst, when a gentleman who knows nothing about our wants, and who derives his inspiration from the trade "Tits Bits," attempts to place heavy wrought-iron fetters upon us, so very many of these same gentlemen hail him as a deliverer?

131, *Embden Street, Manchester.* J. HART.

Sir,—Upon reading the advertisements contained in a recent issue of your valuable Journal, I was greatly surprised at seeing the following:—"Wanted.—A smart young man as Manager of Branch just opened. Must be accustomed to extract teeth, mix paints, and the general routine of a mixed trade."

At first, I was inclined to think that some pharmacist, with a view of opening a discussion, had desired to have it inserted; if that were the case he ought to be highly commended; but upon reconsideration, I could hardly imagine that such was his idea.

Our friend, I presume, required a qualified manager, and he appears to have overlooked, or forgotten, the fact,

that the "art of mixing paints" is not, at present, one of the subjects required for the Minor or Major examination; but I would certainly suggest (if only in order to prevent our friend from disappointment) that such an addition to the list of subjects be made.

It is our duty, as chemists, to wish our brother pharmacist success in his recently opened branch; but I can hardly conceive the idea of many patients submitting themselves to the torture of having teeth extracted, when they would probably be conducted to the surgery by the operator, whose attire would undoubtedly be smothered with paint, or other ingredients, equally as disgreeable, contained in its preparation.

For my part, I should like to see such advertisements returned to the senders. They are, in my opinion, insults to chemists generally, and have a powerful tendency to reduce the trade of a chemist to the level of that of an oil and paint store.

PRO BONO PROFESSIONIS.

LINIMENTUM TEREBINTHINÆ AND SAPO MOLLIS.

Sir,—As probably the earliest and largest manufacfacturers of B.P. soft soap, we think that a few remarks from us on the subject of Professor Redwood's "Note on Linimentum Terebinthinæ and Sapo Mollis" may be of interest to your readers.

Whilst we are at one with the Professor in regarding the green shade required by the Pharmacopœia as no special guarantee of the purity of the oil employed, we cannot agree with him that "yellowish-white" is necessarily the proper colour of a genuine olive oil soft soap. Good quality olive oil may be obtained of various shades, and when properly saponified yields a transparent soap of a colour ranging from green to yellow, according to the oil used.

Doubtless artificial colour is employed by some, and a soap produced solely from cotton-seed oil is made to imitate the shade specified by the Pharmacopœia, but it would be very unfair on this account to stigmatize all green soaps as fraudulent imitations, or, on the other hand, to assume that soap of a yellow shade is of necessity made of olive oil.

Owing to the recommendation of the Pharmacopœia we have been led to select olive oils of a green shade for the manufacture of medical oil soap, and have often found difficulty in securing them pure. We are consequently glad that the matter has been ventilated in your valued Journal, as on more than one occasion we have had a perfectly pure olive oil soap rejected because its shade of colour was not considered sufficiently green.

If we might offer a suggestion it would be that pharmacists should depend on the character and standing of the makers rather than on the colour of the soap.

In conclusion we may add that we very much doubt the value of laboratory-made samples of soap, as it requires practical knowledge and experience to obtain a proper chemical combination between oils and alkalies in small quantities.

The City Soap Works, London. D. and W. GIBBS.

LIQUOR STRYCHNIÆ, B.P., 1867 AND 1885.

Sir,—Having observed the same phenomenon for a long time in the liq. strychniæ, B.P., 1867, as noticed by Mr. Farr and Mr. Maddison to occur also in that prepared according to the 1885 B.P., viz., the separation of crystals of the strychnia from the solution, and as I had the occasion to make up some the other day from the new formula, before doing so I examined the shop bottle in which there still remained about 1½ fluid ounces, and I found a goodly crop of fine, large, well-defined crystals of strychnia. Some measured one-half to five-eighths of an inch long, showing that they must have been slowly formed. These were carefully separated and dried between folds of filter paper and weighed, their weight being found to be 7 grains.

After having found the weight of the separated crystals I then wished to determine the amount of strychnia in the remaining solution, and, having measured 120 minims, carefully evaporated it to dryness and weighed the residue, found it to be ·75 grain, therefore, ·75×4 gave 3 grains of strychnia in solution to the fluid ounce, indicating a loss of 25 per cent. in the strength of it.

The foregoing results were obtained from 8 ounces of liq. strychniæ, 1867, B.P., so that when we add the weight of separated crystals to the weight of strychnia left in solution, the loss of strength is accounted for, as it shows that about 1 grain per fluid ounce of strychnia separates slowly out of solution on standing.

Consequently, when we find the strychnia separating from the solution in the 1867 B.P., which contained 4 grains to the ounce, we will probably find an increased quantity separate from the liq. strychnia, 1885 B.P., as the amount has been increased by ½ a grain to the fluid ounce, the solvent remaining proportionally to the strychnia the same. However, I intend to watch carefully if the deposit of crystals from it be greater than those obtained from the old formula.

JOHN C. HUNTER, A.P.S.

99, Great Western Road, Glasgow.

DISPENSING OF TEREBENE AND TOLU.

Sir,—Allow me to corroborate Mr. T. A. W. Sewell's observations regarding the non-emulsification of terebene with tragacanth. I failed to get a satisfactory result, the terebene separating in small globules.

At the meeting of our Association, Mr. W. S. Turnbull said he had made the mixture to his entire satisfaction by the same method as Mr. J. Bisset's, but using only mucilage of acacia.

It is not to be expected that the discussion on each paper can be printed when so many notes are read on one evening.

ALEXANDER ROBBIE.

Royal Asylum, Morningside, Edinburgh.

ERGOTIN, B.P.

Sir,—Having recently prepared two or three small batches of ergotin, B.P., I have been somewhat surprised to notice the small yield of the purified extract when compared with the quantity of liquid extract originally employed.

The result is all the more noticeable if contrasted with the price for ergotin as given in ordinary trade lists, which, with tolerable uniformity, quote it at 1*s.* per ounce.

Working with 4 lbs. of ext. ergotæ liq., prepared from fine Spanish ergot, and costing about 3*s.* per lb., I can procure no more than 1000 grains of ergotin, which involves a net cost at or near 10*s.* per ounce. I should be glad to know whether the experience of any of your readers coincides with my own in the preparation of this article, and at the same time I should be interested to learn in what particulars the manufacture of commercial ergotin differs from those authorized by the British Pharmacopœia.

Kilburn. CHARLES B. ALLEN.

Erratum.—H. J. Church's letter, page 779, about the middle of second paragraph, *for* "plays and fireworks," *read* "flags and fireworks."

Query.—The paper on the "Spectroscope in Pharmacy," by Mr. W. Gilmour, was published originally in the *Pharmaceutical Journal*, [3], vii., pp. 529 and 569, and was briefly referred to in the 'Year-Book' for 1877. We would remind you that a General Index of the 'Year-Book' has recently been published at a nominal price.

P. H. Marsden.—You have sent two species: *Evernia prunastri* and *Ramalina pollinaria*: Lichenes.

Aberdeen and North of Scotland Society of Chemists and Druggists.—In reference to the subject of a paragraph respecting this Society that appeared on p. 772, we have been requested to state that the annual subscription of a Town Member is one guinea, and that of a Country Member half-a-guinea. It is expected that the annual dinner will take place on the 29th of June.

G. A. Cubley.—Your letter has been received, but we do not think it desirable to alter the decision announced last week to close the discussion.

G. F. Brimson.—Butter of antimony or a mixture of blue vitriol and chloride of iron is usually used for the purpose.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Hooper, Flückiger, Plowman, Madsen, Baxter, Sanger, Sears, Prust, C. B. G.

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Used in the Royal Nurseries.

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"It can be taken when nothing else can."—*Medical Press.*

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Cigars and Cigarettes—Boxes, 3*s.*, 6*s.*, 8*s.*, 15*s.*

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AYRTON & SAUNDERS, Manufacturers of Superior WILLOW BOXES, have had many complaints from Chemists and Druggists throughout the country as to the difficulty of procuring, from the usual Wholesale Houses, their English-made **WILLOW BOXES**, and consequently are obliged to use those of foreign make, which usually are of an inferior, weak and fragile description, with insides full of sharp splinters, and tops and bottoms falling easily away, subjecting users to great annoyance and vexation. To remove this difficulty A. & S. are prepared to execute promptly any orders for their Goods direct from the Manufactory, and to facilitate business will forward, on receipt of six stamps to defray postage, a complete Set of Samples (18), each box marked with its proper size and description.

Prices and Discount forwarded with Samples.

Manufactory and Warehouses:—

149 & 153, DUKE STREET, & 62, PARR STREET, LIVERPOOL.

DINNEFORD'S
FLUID MAGNESIA.

Perfect in purity and uniform in strength.
The most efficacious antacid and mild aperient for delicate constitutions, ladies, children and infants.
Of all Wholesale Druggists.

NEW INVENTION.

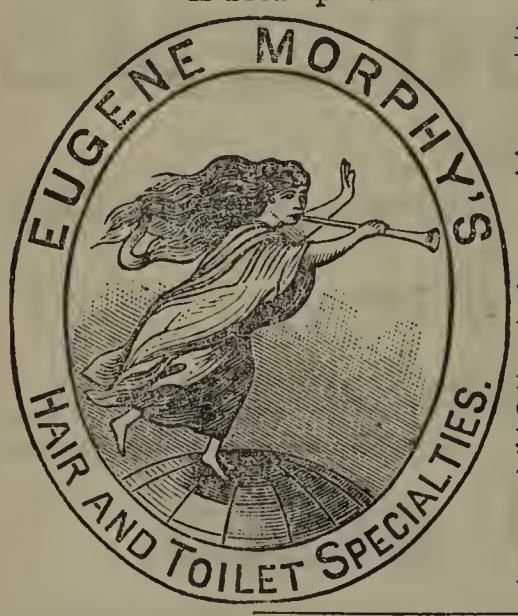
ENAMELLED PATENT LETTERS, for Signboards, Showcards, Price Tickets. Most attractive advertising at less cost than printing or writing. To enable everybody to judge for himself, a Doorplate, with his name elegantly made up, will be forwarded for five stamps with further particulars. For estimates and particulars send stamped envelope. Gilt bevelled-edge Cards at factory prices.
THE BRITISH PATENT LETTER CO., T. STEFAN & Co., 56, Oxford Street, Liverpool. (London Office, 36, Sloane Square, W.).
Agents wanted everywhere.

MAGIC LANTERNS.

Dissolving Views. The Pamphengos gives 12 feet picture. Malden, Esq., compares it to limelight. Triplexicons, 3½, £2 2s.; Duplexicon, 3½, 30s.; Limelight Biunials and Triples. 500 testimonials. 50,000 slides, from 1s. Novelties. Effects. Chemists would find Lantern very profitable recreation for hiring. Charming amusement. Illustrated Catalogues, 8d.; ditto Pamphlets, 2d. The Presto Carriers; The Circulotatory Pamphengos.
W. C. HUGHES, Patentee.
BREWSTER HOUSE, MORTIMER ROAD, KINGSLAND, N. LONDON.

WALNUT POMADE

A Triumph as a Hair Restorer.



AN IMMEDIATE EFFECT.
PLEASANT AND HARMLESS.
FOUR COLOURS—GOLDEN, LIGHT BROWN, DARK BROWN, AND BLACK.

Pots—¾ oz. (1/6) 12/- per doz.; 1½ oz. (2/6) 20/- per doz.

Depilatory Powder.

For removing Superfluous Hair speedily and effectively without injuring the skin.
Retail, 1s.; Wholesale, 8s. per doz.

Agents—Barclay; Edwards; Maw; and Sanger.

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WRIGHT & LAYMAN & UMNEY.

WHOLESALE & EXPORT DRUGGISTS.
IMPORTERS & DISTILLERS OF ESSENTIAL OILS.
MANUFACTURING CHEMISTS
PRICES CURRENT ON APPLICATION
TINCTURES, ETHER, & CHLOROFORM, IN BOND.
SOUTHWARK, LONDON.

HOMŒOPATHIC MEDICINES

E. GOULD & SON,

CHEMISTS TO THE LONDON HOMŒOPATHIC HOSPITAL,

Manufacturing Homœopathic Chemists

WHOLESALE AND RETAIL.

Illustrated Prospectus and Trade Lists forwarded post free.

Agents' Show Cases from 50s. to £20.

59, MOORGATE STREET, E.C.

METHYLATED SPIRIT & FINISH

LICENSED MAKERS

A. & J. WARREN

Wholesale & Export Druggists, 23 & 24, Redcliff St., Bristol

Who offer the same in tins and casks, and can supply best Rectified Spirits of Wine in quantities of two galls. and upwards.

ALSO

STODDART'S SEA SALTS.

Established nearly 40 years. Advertised continually.
1½d. Packets (in dozen boxes), 12/- per gross.

2 lb. Boxes ..	4/- per dozen.	28 lb. Bags ..	36/- per dozen
7 lb. ,, ..	9/6 ,,	56 lb. ,, ..	72/- ,,
14 lb. ,, ..	18/- ,,	112 lb. ,, ..	144/- ,,

Right of manufacture, good will, &c., purchased March 15, 1886.
TERMS:—Monthly Account, less 10 per cent. A reduction on 5 cwt. and 10 cwt. lots.
Carriage paid on orders for the above article amounting to £2 and upwards. Handbills and Showcards furnished on application.

PETROLEUM JELLY

EQUAL TO AND CHEAPER THAN VASELINE.

SANITARY FLUID AND SHEEP DIP,

THE CHEAPEST AND BEST DISINFECTANT.
Grease, Pitch, Asphalte, and all products of Tar and Rosin.
Samples and Prices on application.

GRINDLEY & CO. POPLAR, LONDON, E.

TRADE MARK.

THE ASSOCIATION

FOR THE

SUPPLY OF PURE VACCINE LYMPH,

12, PALL MALL EAST, LONDON, S.W.
SOLE AGENTS FOR

Dr. WARLOMONT'S CALF VACCINE.

Tubes, 2*s*. each. Half Tubes, 1*s*. each. Pomade in vials, 5*s*. HUMAN VACCINE, from healthy children only, microscopically examined and source quoted.—Three tubes, two-thirds full, 5*s*.; Tubes one-third full, and Lancet Charged Points, 1*s*. each; Pin-points, 1*s*. 1*d*. each. Eighteen Charged Small Points, 5*s*.

Tubes two-thirds full (same as those mentioned above, but without source), in quantities for export, £5 per 100 tubes.

Pin-points, uncharged, 1*s*. per dozen.

VACCINATIONS DAILY, between the hours of 12 and 2, by the Consulting Physician, at the uniform fee of a Guinea.

Office hours, 10 to 4; Saturdays, 10 to 2.
P.O.O.'s (including postage, and crossed London & Westminster Bank), with orders, payable to EDWARD DARKE, *Secretary*.

GOLD MEDALS, DUBLIN, 1882; BOSTON, 1883; LONDON (INT. EXHIB.), 1884.

SIR JAMES MURRAY'S
PURE
FLUID MAGNESIA

The Original Preparation of the Inventor,

Has been in use for over 60 years as an excellent remedy in cases of **Acidity, Indigestion, Heartburn, Gravel and Gout.**

Sold by all Chemists in Large-sized Bottles (the 1s. size containing just double the quantity usually sold at same price) at 1s., 2s. 6d. and 3s. 6d. each.

CAUTION.—Observe the signature of the Inventor on every label.

His **FLUID CAMPHOR** is a valuable remedy for **Sleeplessness** and **Weak Nerves.**

Bottles, 1s. and 2s. each.

WHOLESALE OF
SIR JAMES MURRAY & SON,
CHEMICAL WORKS,
GRAHAM'S COURT, TEMPLE STREET, DUBLIN.
BARCLAY & SONS, 95, Farringdon Street, London.

PURE SPIRITS OF WINE.

To Wholesale Druggists, Chemists, Perfumers, &c.

WE are now supplying *Sp. Vin. Rect.*, extra and first qualities, at a very low figure for cash; free from smell, and perfectly clean, also in bond, for exportation.

Methylated Spirit & Finish, 64 O.P.

We are selling the above at the lowest possible cash price of the day, in quantities of Five Gallons and upwards. Quotations upon application.

Naphtha at current market rate.

Catalonian Sherry, 7s. 6d. per gallon, nett.

A good sound wine, combining body and strength, and specially adapted for medicated wines and other purposes.

Orange Wine, finest quality; guaranteed not to cause a deposit or become opaque by the addition of quinine. 5s. 9d. per gallon, nett cash.

Second quality, 4s. 9d., nett.

Our Celebrated Pure Spirit of Wine

Is used by all the principal Wholesale Druggists, Pharmaceutists and Perfumers in town and country (54° to 65°), and will bear testing with Ammonia. It is allowed to be the best article for making Tinctures, Essences, and the most delicate Perfumes, being perfectly free from smell and fusil oil.

Packages to be paid for and allowed upon return.

E. BOWERBANK & SONS,
BISHOPSGATE DISTILLERY,
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Also at DUNNING'S ALLEY and 1, LAMB ALLEY.

N.B.—No connection with the house styled Bishopsgate Distillery and Wine Company.

ESTABLISHED 1782.

EVANS'
FLUID EXTRACTS.
1 OZ. = 1 OZ. OF THE DRUG.

These are prepared by elaborate processes, with the menstruum most suited to each individual drug: in odour and taste they well represent the crude drug, and in strength they contain the *whole* of the active medicinal properties.

Infusions, decoctions, tinctures, wines, and syrups can be at once obtained from these fluid extracts, by simply mixing one minim for every grain of the drug ordered. This is perhaps the most perfect method of making such preparations of an accurate strength.

They are put up in actinic glass bottles of 5, 10, and 20 fluid ounces, capsuled, with a large gold front label: a special feature, to assist in dispensing, is the back label, containing full scientific names, botanical origin, description, medical properties, dose, strength, active ingredients, &c., &c.

Complete list of about 100 kinds, with prices, free on application.

EVANS, LESCHER & WEBB,
60, Bartholomew Close,
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EVANS, SONS & CO.,
56, Hanover Street,
LIVERPOOL.

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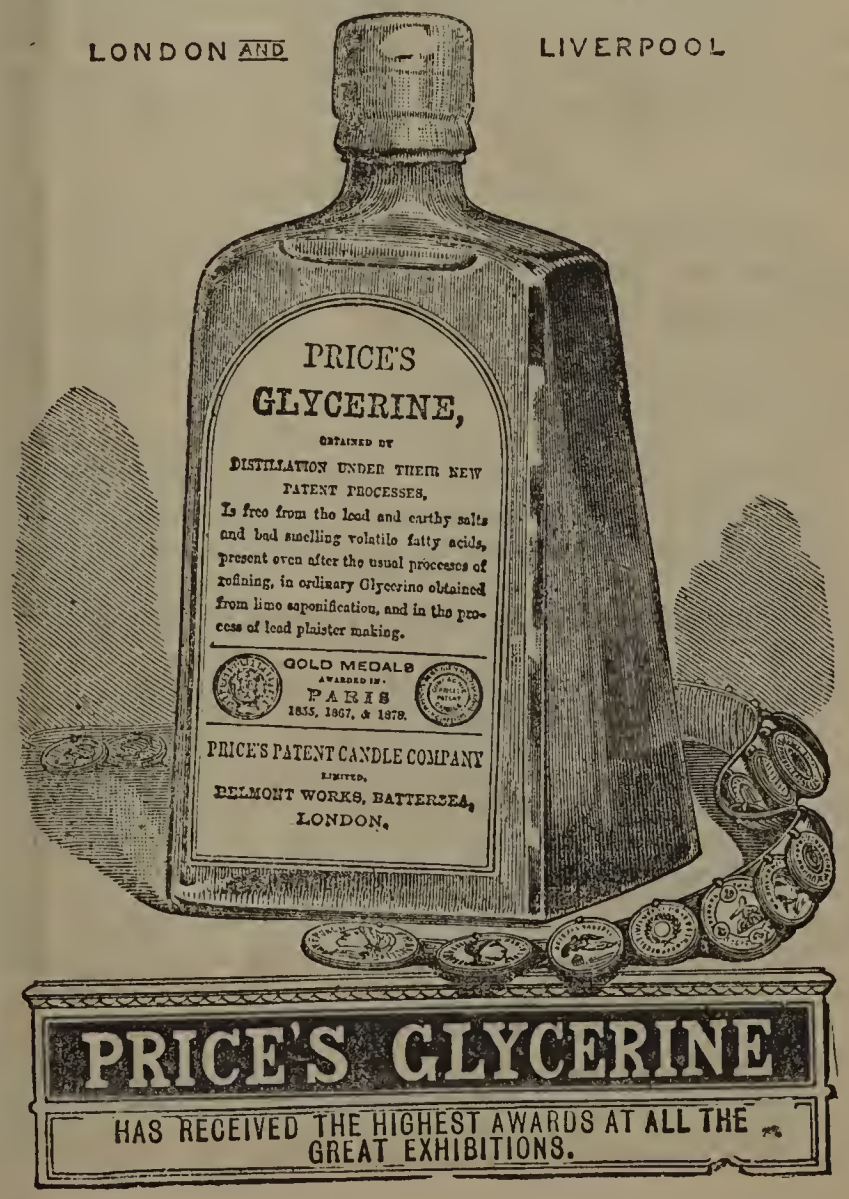
Their Export List, Spanish and English, forms an excellent Advertising Medium for Proprietary Articles. Circulated to the Trade in every quarter of the Globe.

PRICE'S PATENT CANDLE COMPANY LIMITED.

LONDON AND LIVERPOOL



"SYSTEMA OMNIA VINCIT."

SOUTH LONDON SCHOOL of PHARMACY

325, KENNINGTON ROAD, S.E

Director: Dr. MUTER, M.A., F.R.S. Ed., F.I.C., F.C.S., &c.

ESTABLISHED 1ST OCTOBER, 1868.

THE NINETEENTH SESSION, 1886-7.

The next term will commence on the 15th April, 1887.

For Fees, &c., apply to W. BAXTER, Secretary.

LAC BISMUTHI

LAC BISMUTHI ET CERII.

Syr. Hypophosph. Hydrobrom. &c.

SYMES & CO., LIVERPOOL.

"laden with the scent of flowers,
And breath of odorous Spring."

SPINNER'S TEAS.

A Company of Merchants are now selling through SPINNER & CO. the choicest Teas that come from India and China at 2/8, 2/4, 2/-, and 1/8 a pound, in packets only. These are the perfection of Teas, and will please the most fastidious.—Agents wanted in every town and village. For Terms apply to SPINNER & Co., 60, Strand, London.

SPINNER & CO., London and Liverpool.

Chemists' Tea Agency.

WALKER & DALRYMPLE'S
BROKEN-LEAF TEA, 1s. 8d. per lb.
A MONEY SAVING TEA. ABSOLUTELY PURE.
The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S
INTERMEDIATE TEA, 2s. per lb.
BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S TEAS.—
AGENTS APPOINTED, where unrepresented, throughout the United Kingdom.
Prospectus and samples free on application.
Warehouses, 154, 155, 159 and 160, Whitechapel Road, and 2, 4, 6, 8, 10, 11 and 12, Brady Street, London.
P.O.O. payable at head office. Bankers, the National Provincial Bank of England.

"CONCILIO ET LABORE."

THE
MANCHESTER COLLEGE
OF
PHARMACY,

225 & 227a, OXFORD ST., MANCHESTER.

Director—MR. W. SPENCER TURNER.

The classes for the June and July Minor examinations will begin work on Tuesday, April 12. Fees—to the June examination, £5 5s; to July, £9 9s., inclusive of Dispensary and all Chemicals and Apparatus. Students wishing to join before Easter can work in the July class, which is quite distinct from the April one. The Afternoon and Evening classes for July are now far advanced but new men can enter the first or second division, according to their attainments and requirements.

JUDD'S APRIL MINOR.

Entrance for the Day or Night Classes or arrangement should be made at once. Success secured by result payments (the only guarantee). Evening Classes now on for July and October. A last rapid course in all subjects for new comers, April 1st for April exam.

Mr. H. JUDD, W.C.S.P., 31, Regent Square, W.C.

*** *Post free six stamps, a full and exact printed description of the Minor.*

PHARMACEUTICAL PRELIMINARY, LONDON MATRICULATION, & all MEDICAL PRELIMINARIES.

RAPID and thorough preparation, privately and in class. Also Postal Tuition for these Examinations and Bell Scholarship. For particulars, address A. H. DAWES, 1st B.A. Lond., Adderstone, Vardens Rd., New Wandsworth, S.W. (close to Clapham Junction Station

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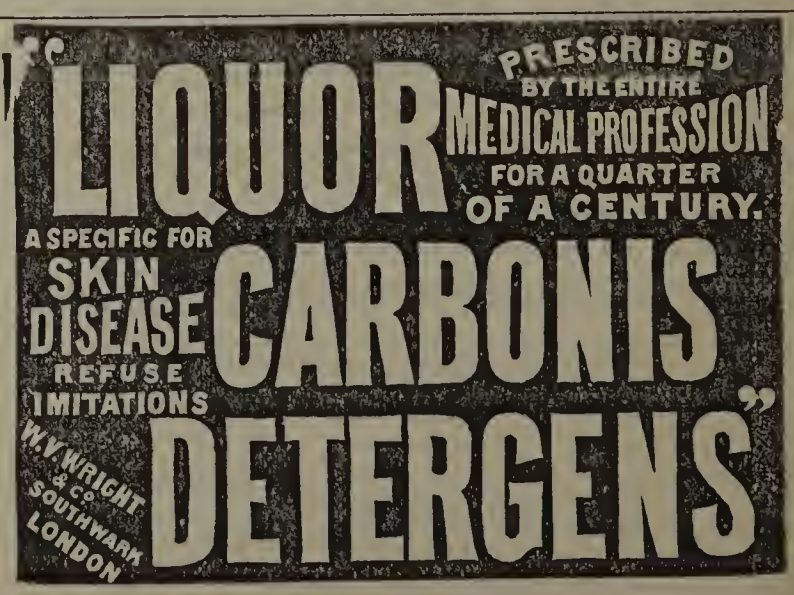

THE

CENTRAL SCHOOL OF CHEMISTRY & PHARMACY

Laboratory and School Buildings:

173, MARYLEBONE ROAD, N.W.

TEACHERS—

Mr. JOHN WOODLAND,

Lecturer on the Art of Prescribing, and Teacher of Materia Medica at St. George's Hospital, S.W.

Mr. T. A. ELLWOOD, M.P.S., &c.

The next course of Lectures for the June and July examinations will commence on Monday, April 25th. Fees—to June examination, 6 guineas; to July, 7 guineas. There are still vacancies for Minor students in the Laboratory, the Major Laboratory being full until the April examination.

For Prospectus, apply to

Mr. JOHN WOODLAND, 173, Marylebone Road, N.W.

Portman School of Pharmacy.

THE new Laboratory and Lecture Hall at Langham House will be opened on Thursday, March 31st, when a Lecture on Dispensing will be given, at 8 p.m., by the Principal (F. HUBERT PAINTER), to which past as well as present students are invited.

Gentlemen desiring Laboratory Practice and Private Tuition for the April Examination should make immediate application.

A Complete Course of Lectures and Practical Laboratory Instruction will commence on April 25th for the June and July Examinations.

For Prospectus and particulars apply

VERNON MITCHELL (Secretary),

PORTMAN PHARMACY (1789),

55a, Gloucester Place,

Portman Square, W.

MUSEUM

SPECIMENS have been received from or promised by:—

Messrs. BURROUGHS, WELLCOME & Co.
,, FLETCHER, FLETCHER & STEVENSON.
J. B. S. LANCASTER, Esq.
Messrs. THE PRICE'S PATENT CANDLE Co., LTD.
,, BOWDLER & BICKERDIKE.

To all of whom the Principal desires to express his sincere thanks.

WESTMINSTER COLLEGE

The next Course of Lectures and Classes will be commenced on Monday, April 25th.

N.B.—Any Gentleman of ordinary ability who enters College at the commencement of the **next** course and attends to his studies will be fully prepared to present himself for the Minor Examination in July.

FEES. { **To the June Exam., £6 6s.; July, £8 8s.**
12 Months' Course (Minor and Major), £15 15s.

Students desiring to enter the College at the commencement of the next Course should send in their names without delay, as the few remaining benches in the Laboratory are being rapidly filled up. The regular course is three months, but those already possessing knowledge may enter at any time when there is room.

PASS LIST.

At the last Examination **5 Major** Students presented themselves, **4** passed:—

Messrs. BARNES, STARK, PARKINSON and WOOD.

Only 3 other Candidates were successful in passing from all other sources.

The following **29 Minor** and **4 Preliminary** Students were also successful in passing their Examinations

A. BENNETT	W. HILDYARD	C. SPENCER
F. W. CARNABY	E. V. HILL	W. C. C. TAYLOR
J. CLAYTON	A. E. HINE	G. TEMPLEMAN
A. COLLINS	E. HOBSON	J. J. THOMAS
F. CROSSLING	J. L. JENKINS	H. E. THOMPSON
H. ELSDON	H. E. LANCE	C. TODD
W. R. GWILLIM	H. R. MILNER	A. UPSON
D. HARRIES	W. A. PAGE	A. H. WADDINGTON
S. W. HEATON	W. PARISH	H. E. WALDEN
R. C. WALSHAW		J. WILSON.

PRELIMINARY.

C. T. BACK A. B. CARRÉ T. F. PRIME F. W. THOMAS.

N.B.—The New Prospectus is now ready. It contains 64 pages of printed matter, and may be had *post free* on application.

EVERY STUDENT SHOULD POSSESS ONE.

WILLS' "POSTAL SYSTEM."

Gentlemen who reside in the country, and are unable to attend a School of Pharmacy, may become Corresponding Students of this College on payment of a fee of £1 1s. for the Minor, and 10s. 6d. for the Major or Preliminary.

"The idea on which this system is based is to arrange for each student his course of study for him, and to provide him generally with that knowledge which he needs to know."—*Chemist and Druggist.*

Apply to **Messrs. WILLS & WOOTTON,**
TRINITY SQUARE, BOROUGH, LONDON, S.E.

PRIVATE TUTOR

Mr. JAS. W. SAUNDERS

(from the Royal School of Mines),

6, ROCHESTER SQUARE, CAMDEN ROAD, N.W.

At the October Minor **Six** of my Pupils presented themselves. **Four** passed. **Four** at the Preliminary. **Three** passed. Private and Postal tuition only. No classes or demonstrators.

LABORATORY CLOSE TO GOWER STREET STATION.

PRELIMINARY & MINOR.

ALL Students who are preparing should send for particulars of a method of study which will enable them to pass with ease. Enclose stamped envelope to Mr. J. TULLY (Hills Prizeman), Chemist, Hastings. Established 1872. References to past and present Pupils. **35** Pupils passed the last Examinations.

STUDENTS' AIDS TO EXAMINATION.

PRELIMINARY.—Arithmetic and Metric System, 1s. How to Write an Essay, 3d. Cæsar Simplified, 1s. Knotty Points in Latin Grammar, 1s. 6d. MINOR.—Equations Simplified, 1s. Illegible Autographic Prescriptions, 1s. Notes on Dispensing, 1s. Prescriptions given at the Minor, 6d. CHEMIST, care of Mr. J. Edwards, Wye, Kent.

TO MINOR STUDENTS!!!

(A GREAT BOON)

A.P.S. has now ready special short cuts to the—

"EXTRACTS & OPIUM,"

with all its preps. P.B., 85, so arranged that all information required for Minor in the above may be perfectly learnt by a few readings. Both sent on receipt of 12 stamps, with stamped addressed envelope. Address, A.P.S., 13, Elgin Crescent, Notting Hill, W.

NOTES ON DISPENSING

By GEORGE STIRLING,

Consisting of hints on the manipulation of Mixtures, Pills, Emulsions, Suppositories, &c. Special notes on difficult Pills and Excipients, alphabetically arranged. Interleaved with blank paper for M.S. notes. Post free 13 *stamps.*

DOSES OF B.P., 1885,

Compactly arranged for vest pocket. Easily mastered. Convenient for reference. Post free 6 *stamps, from publisher,*

JOHN GOWER, 47, Sigdon Road, Hackney, London.

ENGAGEMENTS WANTED.

Advertisements under this heading are charged as follows—
Twelve words not exceeding two lines, or less, 1*s.*; *each additional six words, or less,* 6*d.*; *two initials or two figures counting as one word.*
N.B.—Postage Stamps cannot be received in payment.

AT the Easter Term, by a Youth who has passed the Cambridge Local Junior, an APPRENTICESHIP to a first-class Pharmaceutical Chemist. Premium given. North Country preferred. Apply to JOSEPH ERRINGTON, Barnard Castle, Co. Durham.

LOCUM TENENS. High-class trade only cared for. Town or country. Disengaged. Ætat. 30. Highest references. Moderate terms. MANAGER, 195, Norwood Rd., Herne Hill, London.

JUNIOR. 3½ years' experience. References. Age 21. Height 5ft. 6in. Total abstainer. A. F, 86, Fore St., Devonport.

JUNIOR or IMPROVER. Age 20. 5ft. 11½in. 4 years' experience. Total abstainer. J. L., 27, Cumberland St., Caledonian Rd., Islington, London, N.

AS MANAGER in Retail, or ASSISTANT in Laboratory. Thoroughly experienced (10 years) in the provinces, London, and on the Continent, and well read. Major qualification. Age 25. Height 5ft. 8in. NEMO, Mr. Wheeler, 39, King's Rd., Brighton.

AS JUNIOR, in good London house. Age 24. Minor. C., 7, Poultry, E.C.

JUNIOR or IMPROVER. Disengaged. Age 20. 3 years' experience. Good references. Abstainer. H. MASTERS, 30, Binswood Avenue, Leamington.

MANAGER or ASSISTANT. Married. Minor qualification. CHEMICUS, 18, Great Church St., Wisbech.

JUNIOR. 18. Passed Prelim. Experience wanted. Wages secondary. ELPHINSTONE, New Pitsligo, Aberdeen.

ENGAGEMENTS WANTED.

LOCUM TENENS. Registered. Prescriber and worker. Moderate terms. OPERARIUS, Brentwood, Essex.

ASSISTANT or to MANAGE Branch. Age 25. Varied experience. Prescriber and Tooth Extractor. AQUA, 7, Vicarage Rd., Oldbury, Birmingham.

AS ASSISTANT abroad, or DISPENSER to a Surgeon, by advertiser. Age 31. 16 years' experience. DELTA, Mr. Forrest, Chemist, South Shields.

AS JUNIOR. 5 years' Retail, 12 months' Wholesale. Age 20½. Out-door preferred. Disengaged April 13th. F. LEAFE, High St., Clay Cross, near Chesterfield.

AS ASSISTANT in a good Wholesale or Retail house (London preferred). Age 27. 11 years' experience. Highest references. X. Y., 8, Robert St., Oxford St., W.

JUNIOR. Age 20. Disengaged. Good reference ALPHA, 51, Monkton St., Ryde, I.W.

IMPROVER or JUNIOR. 2 years' experience. Active and willing. Country preferred. A. R., 441, Edgware Rd., W.

MANAGER of Branch or SENIOR. Qualified. Highest references. London and Dublin experience. BRIEN, 22, Gt. Portland St., London.

MEDICAL Man and Chemists.—Wanted, situation as DISPENSER in Public Institution or Surgery. 20 years' good Dispensing experience. Highest Medical and other testimonials. Or as MANAGER in shop where hours are easy. Qualified by examination. Mr. KEELEY, 39, Fairfax Rd., St. John's Wood.

AS CLERK, BOOK-KEEPER, or CORRESPONDENT in a Wholesale or Retail Drug house. 10 years' experience. Competent knowledge of the business. C. B., 7, Grange Pk., Thornton Heath, Surrey.

ASSISTANT. Experienced. Disengaged middle April. London preferred. With time for study. Salary accordingly. Present employer's references. G. C., 60, Smithford St., Coventry.

AS IMPROVER. Age 20. W. JOHNSTON, 5, Spring Ter., Dover Rd., Folkestone.

JUNIOR. Age 20½. 7 yrs.' experience. Neat Dispenser. Good reference. Knowledge Telegraph (S.N.). Midlands preferred. PHILPOTT, Wotton-under-Edge.

AS ASSISTANT or to MANAGE branch. Temporary or permanent. Prescribe, Extract Teeth, &c. Salary moderate. Age 33. AQUA, 86, New Rd., Great Bridge, near Tipton.

MANAGER or Senior ASSISTANT in first-class Dispensing establishment. Qualified. Ætat. 29. Height 5ft. 6in. Good references. CHEMICUS, 21, Dale St., Leamington Spa.

JUNIOR. 4½ years' Retail and Dispensing experience. R. P., 100, Fishergate, Preston.

JUNIOR. Part-time. Age 21. Hall qualification. Good references. Disengaged April 8th. GRAY, 96, Westbourne Grove, W.

MR. TAYLOR, Chemist, Sunninghill, strongly recommends his porter, aged 20, as WAREHOUSEMAN in Wholesale Druggist's or Sundries'. Writes well, can wrap parcels neatly; accustomed to weigh Seidlitz. 4 years in present situation.

JUNIOR. Age 21. 4½ years' experience. C. TOMLINSON, Easthorpe, Bottesford, Nottingham.

JUNIOR ASSISTANT. Age 22. 5 years' experience; also in Teeth Extracting. In or out-door. CHEMICUS, 60, Gladstone St., Leicester.

QUALIFIED Chemist (experienced) is open to situation as MANAGER of Branch or otherwise. CHEMIST, 41, Sherwood Rise, Nottingham.

ENGAGEMENTS WANTED.

MANAGER. Married. Age 35. Varied experience. Good references. 13 years in last situation. ALPHA, 11, Hicks Rd., Seaforth, Liverpool.

JUNIOR. London. Age 22. Height 5ft. 8½in. M., 86, North St., Edgware Rd.

DISPENSER. Major. Age 23½. Height 5ft. 6½in. 6 years' experience. Sound references. J. E. BURY, Sutton, Shipston-on-Stour.

DISPENSER to Surgeon. Used to large practice. Including Hospital and Clubs. Or with Chemist if another is kept. Salary no object, if other advantages offered. Good reference and testimonials. AQUA, Mr. Atkins, Chemist, Woolwich.

JUNIOR. Age 22. 4½ years' experience. Abstainer. REYNO, 59, Camberwell New Rd.

DISPENSER to Surgeon or Chemist. Understands Postal Duties. Disengaged from 1 till 7 p.m. each day. Would take duty every Sunday if necessary. HYOS, 203, Roman Rd., Bow, E.

LOCUM TENENS MANAGER for Widow or Exors. Qualified. CHEMIST, 43, Gascony Avenue, N.W.

APRIL 20th.—Student offers services after six p.m., in lieu board and lodging. Near Marylebone Rd. preferred. CHEMICUS, care of Mr. Arman, Sorting Office, New Wimbledon.

TEMPORARY. Out-door. Manage Branch. Large experience. Age 29. Tall. Minor. Married. W., 49, Gillespie Rd., Highbury, N.

JUNIOR. Disengaged. Age 20. Nearly 5 years' experience. Height 5ft. 9in. Good references. S. H. MUMFORD, 125, Fitzroy St., Cambridge.

IN Dispensing business. Good experience and references. Age 23. Disengaged. C. E., 8, Mary St., Bow Rd., London, E.

IMPROVER. 3 years' experience. 18½. Height 5ft. 9in. Good reference. Disengaged. OWEN, Brynamlwg, Llannon, viâ Aberystwith.

AS MANAGER of Branch or out-door ASSISTANT. Age 35. Married. Speaks French and German. West-end and Continental experience. CHEMIST, 47, Church St., Camberwell.

AS ASSISTANT. Age 24. Height 5ft. 10in. 8 years' experience. F. JOHNSON, High St., Tadcaster.

BY Steward and Compounder of Medicines, Lock Hospital, Chatham. Hospital closes 25th inst., after which please address, STEWARD, 17, Hudson Rd., Plumstead.

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BY an experienced ASSISTANT in good class businesses. Part-time for study. Small salary. EXAM., 122, High Holborn, W.C.

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TO Students.—First-class board and lodging, with assistance in studies by a Senior Medallist, for 13s. weekly and occasional help in the shop of evenings. Penny tram to Wills' or Muter's. All my assistants (except one) have passed Minor at first presentation. Ivanhoe Pharmacy, Denmark Pk., S.E.

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REGISTER

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19*th March*, 1887.

BY Order of the Secretary of State for India in Council.—The Director General of Stores for India is prepared to receive Tenders from such persons as may be willing to supply a Machine for Compressing Medicinal Powders into Cones and Tablets. The Conditions of Contract may be had on application to the Director General of Stores, India Office, Whitehall, S.W., and Tenders are to be left at his office at any time before Two o'clock p.m. on Tuesday, the 29th March, 1887, after which no Tender will be received.

A. ABERCROMBIE JOPP,
Director General of Stores.

TO Investors.—For immediate disposal, Fifty £5 fully paid Shares (or any part) in a Gas Company in full work. Six per cent. guaranteed. Address, V. T. S., Messrs. Deacon's, Leadenhall St., E C.

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5. COUNTY TOWN, WEST OF ENGLAND.—Retail and Dispensing BUSINESS, with Wine and Spirit trade attached. Returns nearly £800 yearly. Capable of great extension. Nett profits about £300. Good house. Large, attractive garden, well-stocked with fruit and flowers. Price about £650.

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WANTED.—First-class Dispensing Businesses, either in London or good Provincial Towns. Profits not under £500 yearly.

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London: Printed by William Inglis Richardson, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. Churchill, 11, New Burlington Street.

The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 875.] SATURDAY, APRIL 2, 1887. [PRICE FOURPENCE

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

NOTICES.

ANNUAL SUBSCRIPTIONS.

All Annual Subscriptions are now due.

Subscription payable by Members and Associates in Business £1 1 0

Subscription payable by Associates and Apprentices or Students 0 10 6

Cheques and Post Office Orders should be made payable to the Secretary, and crossed "London and Westminster Bank."

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

EVENING MEETING.

17, BLOOMSBURY SQUARE, LONDON.

An Evening Meeting of the Society will be held at 17, Bloomsbury Square, London, on Wednesday, April 13th, at half-past Seven o'clock.

The chair will be taken at Eight *precisely*.

With a view of affording greater facilities for the inspection and examination of Specimens and Apparatus placed on the table for exhibition, the Lecture Theatre will be opened at 7, and the Curator of the Museum will be in attendance to give any information or explanation in regard to the articles exhibited that may be required.

Members and others desiring to exhibit objects of interest will oblige by communicating with the Curator of the Museum as early as possible.

Papers intended to be read at that Meeting should be forwarded to the Secretary not later than Tuesday, April 5th, as papers received after that date cannot be announced in the *Pharmaceutical Journal* previous to the Meeting.

PRELIMINARY EXAMINATION.*

This Examination will be held throughout Great Britain, at 11 a.m., on the **second Tuesday** in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

Each Candidate must state at which of the following centres he desires to present himself:—

Aberdeen	Cheltenham	Inverness	Norwich
Birmingham	Darlington	Jersey	Nottingham
Brighton	Douglas, Isle of Man	Lancaster	Oxford
Bristol	Dundee	Leeds	Peterborough
Cambridge	Edinburgh	Lincoln	Sheffield
Canterbury	Exeter	Liverpool	Shrewsbury
Cardiff	Glasgow	London	Southampton
Carlisle	Guernsey	Manchester	Truro
Carmarthen	Hull	Newcastle	Worcester
Carnarvon		Northampton	York

* A Certificate of having passed any of the examinations approved by the Council (a list of which may be obtained from the Registrar) will be accepted in lieu of this Examination, provided Latin, Arithmetic, and English were included in the subjects of the Examination for which the Certificate was granted.

The Certificate must be forwarded to the Registrar, with the fee of Two Guineas, for the approval of the Board of Examiners, and must be so approved before the Candidate is eligible to enter his name for the Minor Examination.

Price 1s., or post free 1s. 6d.

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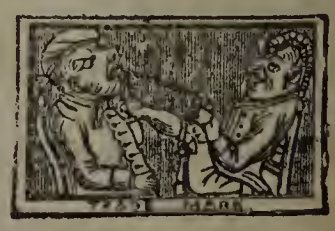

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,, 1879	..	350	..	None
,, 1880	..	430	..	None
,, 1881	..	540	..	None
,, 1882	..	615	..	3¾
,, 1883	..	708	..	5
,, 1884	..	908	..	6
,, 1885	..	1,193	..	6
,, 1886	..	1,463	..	6

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		£	s.	d.
1879	Loss	260	13	8
1880	Profit	275	0	1
1881	,,	729	5	3
1882	,,	904	18	0
1883	,,	1,307	2	10
1884	,,	1,919	0	4
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MACKEYS' TEREBENE COUGH LOZENGES. Recommended by Dr. W. Murrell, F.R.C.P., for the cure of Winter Cough, Bronchial and Asthmatic Complaints, preventing Accumulation of Phlegm.

Mackey, Mackey & Co. are Manufacturers of the New Soluble Transparent and Pearl Coated Pills of the Pharmacopœias and private formulæ as required. These Pills possess numerous advantages over the pills of other makers.—*They never crack or split. The coating does not peel off. They are moderate in price. The ingredients are carefully selected, and of the best quality. The coating, which dissolves in about half a minute, is put on while the mass is soft, thus keeping the Pill in a perfectly soluble condition. It is unimpaired by age, is quite transparent, and the taste of the Pills is perfectly covered. The excipients chosen tend to preserve the soluble character of the Pill, and increase the medicinal effect of the drug.* **All Pharmaceutical Preparations of best quality.**

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24th MARCH, 1887.

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"THE MONTH."

"Antithermin" is the name that has been proposed for a new synthetically prepared compound which has just been added to the army of antipyretics (*Nouv. Rémèdes*, March, p. 102). The systematic name of the compound is "phenylhydrazinlevulinic acid," from which it is evident that it has a near chemical relationship with "antipyrin." It will be remembered (see before, vol. xv., p. 341) that one of the intermediate products in the formation of this widely used antipyretic is phenylhydrazin, the composition of which is represented by the formula—

Antithermin.

$$N_2\begin{cases}C_6H_5\\H\\H\\H\end{cases}$$

This compound has the property of combining with other compounds to a remarkable extent, as, for instance, with aldehydes, ketones, sugars and ketone acids, antipyrin being, in fact, a methylated derivative from a compound of phenylhydrazin with acetoacetic acid. The new antipyretic is a compound of phenylhydrazin with acetopropionic acid, a homologue of acetoacetic acid, to which the name levulinic acid also has been applied because it can be prepared by oxidizing levulose. Phenylhydrazinlevulinic acid, or antithermin, is said to be obtained by dissolving phenylhydrazin in dilute acetic acid, and adding to it a solution of levulinic acid, which gives rise to a yellow precipitate that yields well-formed crystals upon recrystallization from alcohol.

Still another antipyretic that is threatened to invade us from Germany is described variously as being p-acetphenetidin (*Cent. f. med. Wissensc.*, 1887, No. 9) and p-acetphenidin, or acetylized p-amidophenol, $NH_2.C_6H_4O.CH_2.CO_2H$ (*Pharm. Centralh.*, March 17, p. 143). A writer in the *Pharmaceutische Zeitung* (March 26, p. 178) points out that this leaves the identity of the compound still in doubt, for not only is the formula given inconsistent with either name, but that para-amidophenol is theoretically capable of yielding two acetyl derivatives, an acetyl residue replacing hydrogen in the NH_2 group in one and in the HO group in the other. Probably, however, as the compound is the subject of a patent this is of little practical importance. The compound is said to occur in small colourless or faintly reddish needles, which are tasteless, difficultly soluble in water, but somewhat more freely soluble in alcohol and strong acetic acid; and melt at 135° C. The preparation is given in doses of 0·2 to 0·5 gram, but according to Messrs. Hinsberg and Kast, who have experimented with it, doses of 1 to 2 grams have proved harmless. Up to the present time this new antipyretic does not appear to have been favoured with a trivial name, but should it come into sufficient use to make one desirable, it may be hoped that an effort will be made to get outside the monotony of "anti" which now threatens to become a source of confusion.

Acetyl-Amidophenol.

Whilst lecturing recently in Vienna on the treatment of typhoid fever Professor Nothnagel made some interesting remarks on the relative action of certain antipyretics when administered for the purpose of reducing temperature in that disease (*Med. Press and Circ.*, March 16 and 30, pp. 238, 291). The Professor laid it down as an axiom that the more energetically and rapidly a "chemically acting antipyretic" reduces the temperature the more marked are certain phenomena which have been recognized as concomitant symptoms, and under some conditions as dangerous concomitants of the natural reduction in temperature of the crisis. This is seen very markedly, for instance, when such a substance as resorcin or kairin is administered: the temperature falls rapidly; the patient sweats profusely; a pulse and cardiac action are set up that suggest collapse, or there is even collapse; afterwards the temperature rises again with a rigor or chill. The same appearances may be observed after the administration of thallin, antipyrin or antefebrin,—which he considers to be about equal as antipyretics,—but not to so great a degree. The temperature, after the administration of one of these, does sometimes fall with more or less pronounced symptoms of collapse, but not always, nor even as a rule; this may depend partly on the size of the dose, or partly on individual susceptibility. Professor Nothnagel therefore denounces as incorrect and unphysiological the practice of introducing a new antipyretic with the statement that it produces no disagreeable bye-effects, since the most that can be justly claimed for any of this class of antipyretics is that such symptoms following its use are relatively infrequent. With quinine the fall of temperature is still less rapid, the effect is more lasting, and the subsequent rise, when it occurs, takes place more slowly; whilst the objectionable symptoms are practically absent. Sodium salicylate stands about half-way between quinine and the thallin group.

Action of Antipyretics.

Helenin, the stearoptene obtained from elecampane root (*Inula Helenium*) has been recommended in the treatment of tuberculosis and diphtheria and credited with being a powerful antiseptic (*Pharm. Journ.*, [3], xv., 890; xvi., 919). But according to Herr Marpmann (*Pharm. Centralh.*, March 10, p. 123) the root yields two other compounds, both of which are more powerful antiseptics than helenin; these he has named alantol and alantic acid, apparently from the German popular name of the root "Alantwurzel." They are obtained by the distillation of the root, which yields a mixture of helenin, alantic anhydride and alantol. Alantic acid ($C_{15}H_{22}O_3$) is described as crystallizing from alcohol in white crystals, melting at 91° C., and subliming as the anhydride ($C_{15}H_{20}O_2$). Both the acid and anhydride are insoluble in water, soluble in alcohol and fixed oils, and form with alkalies readily soluble salts. Alantol ($C_{20}H_{32}O$) is an aromatic lævogyre liquid that boils at 200° C., combines after a time with water and possesses "ozonizing" properties. It is probably formed during the distillation from some other constituent of the root. Alantic acid and alantol were always obtained as a mixture, and this mixture is said to have given better results than helenin in the treatment of tuberculosis, whilst its use can be continued a long time without inconvenience. The author states that only fresh roots should be used for distillation, as the roots appear to lose their active constituents with age. Dr. Dono reports (*Nouv. Rém.*, p. 142) that he has employed helenin with favourable results in three cases of chorea, in doses of 2 centigrams three or four times a day. It is also reported to have been given with success in bronchitis and spasmodic cough.

Alantol and Alantic Acid.

Hydrangea arborescens, used in the United States as a remedy for urinary calculi, has been submitted to an analysis by Mr. C. S. Bondurant, with the view of ascertaining the character of its active principle. He was unable to find in it any evidence of the alkaloid reported by a previous investigator (*Am. Journ. Pharm.*, 1881, p. 157), but obtained a glucoside in stellate clusters of crystals. To this body the name of hydrangin has been given. In presence of an alkali, the aqueous solution gives an opal-blue fluorescence, destroyed by acid. From æsculin it differs by its ready solubility in ether, its insolubility in strong hydrochloric acid, and by not being precipitated by argentic nitrate, mercuric chloride or neutral lead acetate. A characteristic reaction for this glucoside is obtained by dissolving it in sulphuric acid, and adding a small crystal of bichromate of potash, when a dark purple colour is produced, fading after some minutes to violet. On the addition of a few drops of water an olive-green is produced, which gradually fades. Hydrangin melts at 235° C., and on the temperature being increased, sublimes without decomposition. Absolute alcohol was found to extract the glucoside together with a resin insoluble in ether, and a reddish colouring matter soluble in chloroform. Another resin, soluble in ether, is also contained in the root. Water extracts mucilage, saponin and sugar (*Am. Journ. Pharm.*, March, p. 124).

Hydrangea arborescens.

In the *Boston Medical and Surgical Journal* (March 10, p. 227) attention is directed by Dr. J. S. Howe to the poisonous effects of the common moon daisy (*Leucanthemum vulgare*) upon certain individuals, chiefly those who suffer similarly from the poison of *Rhus Toxicodendron*. The symptoms produced are those included in the description of dermatitis venenata, and consist in the troublesome heat and itching and the formation of vesicles, followed by desquamation of the cuticle. It is curious that this action does not appear to have been noticed in this country, where the plant is so common, although *Anthemis Cotula* is known to cause somewhat similar symptoms.

Leucanthemum Vulgare.

The aloin of Curaçoa aloes has been examined by Professor W. Stoeder (*Nieuw Tijdschrift v. de Pharm. Neder.*, p. 98). The aloin was obtained by Tilden's method; 250 grams of the aloes were dissolved in 2 litres of water, containing 1 per cent. of sulphuric acid, and the solution after twenty-four hours was decanted from the resinous deposit which had formed, and was evaporated on a water-bath to half its volume. In a few days a crystalline crust had formed, which, drained, pressed between blotting-paper, and recrystallized from spirit of 92 per cent., afforded sulphur-yellow microscopic obtuse needles. The yield of aloin thus obtained was 5·5 per cent. It is odourless, has a bitter taste, melts when heated, becoming black and diffusing an odour of caramel, and then burns leaving no ash. It is moderately soluble in water, very soluble in spirit, and in pure ether and chloroform almost insoluble. The solution in water is of a light yellow colour; ammonia makes it darker and then red. When the aqueous solution is heated, the upper layer becomes red, and this colour spreads quickly through the solution, turning to wine-red, indicating oxidation to aloetin. It quickly reduces Fehling's solution when warmed. Sulphuric and nitric acids colour it a pure red, but on stirring the mixture it becomes yellow. If then the vapour of fuming nitric acid be passed over it, a greyish blue colour is produced, which, however, quickly disappears. Bromo-bromide of potassium gives an abundant precipitate in an aqueous solution of Curaçoa aloin. Solution of tannin gives no precipitate. It thus resembles nataloin in the effect produced on it by fuming nitric acid, and is like barbaloin and socaloin in the formation of a bromo-derivative, but differs from barbaloin in not giving a precipitate with tannin.

Curaçoa Aloin.

A false kola nut is described in *Nouv. Rémèdes* (p. 123) by Messrs. Heckel and Schlagdenhauffen, which they consider to be an intentional adulteration due to the increasing demand for kola nuts. It consists of the kernels of the seeds of *Heritiera littoralis*, Ait., a tree belonging to the same family as the kola, and extending from Australia and the Philippines to the east coast of Africa. Under the microscope the adulteration can be detected by the smaller size of the polygonal starch grains, which are only half the size of those of the true kola nut. In the entire state the kernel is easily distinguished by the fact that one of the cotyledons is hardly half the size of the other, fitting into the substance of the larger one, and that the shape of the seed is orbicular and flattened. It did not afford any trace of caffeine.

False Kola Nut.

The seeds of *Eugenia jambolana* have been tried by Dr. G. C. Kingsbury, as a remedy for diabetes, with some degree of success. In a case which had lasted for six months, and in which the patient was quite prostrate, and suffering from great thirst, the administration of 5 grains six times in twenty-four hours for a fortnight removed the abnormal thirst and hunger, and enabled the patient to get up and walk for an hour at a time (*Brit. Med. Journ.*, March 19, p. 617.)

Eugenia jambolana.

A crystalline acid possessing more powerful reducing properties than glucose, has been detected in urine by Dr. John Marshall of Pennsylvania University. It was obtained by precipitation with tribasic plumbic acetate solution, decomposing the washed precipitate with hydrogen sulphide and allowing the filtrate, after concentration, to deposit crystals. The new acid crystallizes in opaque white tetragonal prisms melting at 140° C. It is soluble in water and ether, in ordinary and absolute alcohol, sparingly so in chloroform, and insoluble in benzol, toluol and petroleum ether. When the ethereal solution is evaporated at a temperature of about 60° C., a slight claret-red tint is produced, soon resolving itself into spots of purple. This purple substance (somewhat resembling murexide) attaches itself to the crystalline mass. When the crystals are dissolved in water the purple coloration disappears. No change of colour is observed on the spontaneous evaporation of the aqueous solution. The new acid does not contain either sulphur or nitrogen and has been provisionally named glycosuric acid. After passing the urine containing the acid through animal charcoal, the filtrate becomes of a dark claret-red colour and has lost its reducing property.

Glucosuric Acid.

The result of a number of experiments as to the mode of action of colchicine administered in therapeutic doses, has been reported by Messrs. Mairet and Combemale (*Comptes Rend.*, civ., 515). It has been found

Action of Colchicine.

that colchicine acts, according to the dose, either as a diuretic or a purgative, consequent upon a congestive and irritant effect produced upon the kidneys and digestive canal. The therapeutic effects are the same whether it be administered subcutaneously or by way of the stomach, but the action is more rapid by the former mode, and the dose required is smaller. Human beings are three times more susceptible to the action of colchicine than dogs or cats, the total dose fixed by the authors to produce the diuretic effect in a man being 2 or 3 milligrams, and for the purgative effect 5 milligrams. Colchicine augments the excretion of uric acid and reduces the quantity contained in the blood; but its accumulation in the system and great toxicity suggest great prudence in its employment.

Liquor Strychninæ.

An editorial note appears in the *Canadian Pharmaceutical Journal* (March, p. 113) apparently confirming the opinion that under certain conditions the official solution of strychnine becomes unstable, depositing crystals of the hydrochlorate. The writer states that in December a sample of the liquor, said to have been prepared by the pharmacopœial process, was received for examination. Most of the salt appeared then to have deposited in a crystalline mass at the bottom of the bottle. The sample was set on one side, until the receipt of the *Pharmaceutical Journal* containing a note on the subject by Mr. E. H. Farr (Jan. 15, p. 580) again called attention to it. The quantity of crystals was then found to be somewhat less, though still considerable, but meanwhile the surrounding temperature had frequently risen above 80° F. The remaining crystals were not redissolved until the bottle had been made sensibly warm; but on putting the bottle outside the window, in melting snow, they were again quickly deposited.

Emulsion of Cod Liver Oil.

Mr. Adolph Tscheppe calls attention to the advantages presented by decoction of Irish moss for preparing an emulsion of cod liver oil (*Pharm. Rec.*, March 15, p. 82). He uses a decoction made at a water-bath temperature and strained, with the moss in the proportion of one drachm to five fluid ounces of water, with which he says an emulsification can hardly fail. The formula recommended is:—Decoction of moss, 5 parts; glycerine, 2 parts; alcohol, 1 part; flavour with oil of wintergreen and oil of bitter almonds, and when cold add cod liver oil, 8 parts, in three portions, shaking vigorously after each addition. The glycerine and alcohol are introduced for preserving and sweetening only, and play no part in the emulsification. If salts require to be added they may be dissolved in the strained decoction, or they may be added in solution to a correspondingly more concentrated decoction. Mr. Tscheppe also mentions that a solution of gelatin (1 drachm in 8 fluid ounces of water) will emulsify an equal bulk of oil, the emulsion on dilution resembling milk very closely; but this preparation is subject to great changes in consistency with differences of temperature, and congeals completely in the cold.

Oil of Peppermint.

During a trial which recently took place in Wayne County, United States, concerning fraudulent oil of peppermint, it was shown that the oil had not only been deprived of menthol, but had been largely adulterated with oil of camphor. According to Dr. Duffield, the removal of menthol may be detected by subjecting the oil to a low temperature (−12° F.), and the presence of camphor oil by the use of a Mitscherlich polariscope, since oil of peppermint, if pure, polarizes to the left −64°, and oil of camphor to the right +57°.

Adulterated Eucalyptus Oil.

In a paper on the means of testing the purity of essential oils, published in the *L'Union Pharmaceutique*, p. 103, by M. Noel, it is stated that oil of eucalyptus often contains a large proportion of oil of turpentine. In four samples examined by the author he found 20 per cent. or more of this adulterant. Oil of lavender he states to be often adulterated with oil of spike (*Lavandula Spica*).

Liquid Paraffin for Hypodermic Injections.

The hypodermic administration of iodoform, eucalyptol and carbon bisulphide having been suggested recently for the treatment of pulmonary tuberculosis, Dr. Meunier, of Lyons, recommends the use of liquid paraffin as a vehicle presenting the advantage over solvents usually employed of modifying the irritant properties of these medicines (*Archives*, March, p. 97). Dr. Dujardin-Beaumetz confirms the beneficent influence of the liquid paraffin, without at present pronouncing definite judgment on the therapeutic effects of the treatment, beyond saying that after the injection of eucalyptol dissolved in an equal quantity of liquid paraffin the patient expectorates less, coughs less frequently and sleeps better. He, however, recommends great care to be exercised in the selection of the paraffin, any sample that has been treated with sulphuric acid being objectionable. Besides being neutral to litmus and free from taste or smell it should not give off vapour below 180° C., as the lighter fractions used for burning, etc., give rise to abscesses, and the sp. gr. at 15° C. should be between ·870 and ·895. Liquid paraffin dissolves ether, chloroform, fixed and essential oils, myrtol, eucalyptol, menthol, thymol, terpinol, benzine, and carbon bisulphide in all proportions, and considerable proportions of iodine, bromine, phosphorus and iodoform. The proportion of iodoform may be increased by adding it to the liquid paraffin in ethereal solution.

Antidote to Cocaine Poisoning.

The use of nitrite of amyl as an antidote in cases of poisoning by cocaine is recommended in the *Lancet* (p. 587), for relieving the cerebral anæmia, and that of bromide of potassium and the application of cold for the convulsions which appear to be the main cause of death in fatal cases.

Remedy for Snake-bite.

A remedy used for snake-bite by the Sioux Indians has recently been brought to light. The *Pharmaceutical Era* states that the plant is *Echinacea* (Rudbeckia) *angustifolia*, and that the popular name of the plant is "black Samson." The fresh root is used, being scraped and administered to the person bitten. It produces an excessive flow of saliva and perspiration. The pungency of the root is said to resemble that of prickly ash bark, and it, therefore, probably may be classed among the active sialogogues.

Poisoning by Robinia.

The tree commonly known as the acacia tree (*Robinia Pseudacacia*, L.) in English gardens, and which is readily recognized by its white flowers bearing a family likeness to those of the laburnum, and by its pinnate leaves, appears to be as poisonous as the last-named tree, since Dr. Z. T. Emery reports the poisoning of thirty-two boys, at the Brooklyn Orphan Asylum, from chewing the inner bark of

the tree (*Am. Journ. Pharm.*, p. 153). The symptoms produced were similar to those of laburnum poisoning. The cases were treated with subcarbonate of bismuth and brandy internally, and with morphine hypodermically administered. The poisonous principle of the bark does not appear to have been investigated.

Optical Properties of Mosses.

Recent observations have shown that the peristome of some mosses possesses curious optical properties. According to Mr. M. J. Aumann, sometimes the outer layer of the peristome and sometimes the inner layer rotates the plane of polarization, and exhibits, when a thin plate of mica or selenite is interposed, very brilliant colours, varying with the position of the two nicols relatively to each other. In the Grimmiaceæ and Dicranaceæ this action is feeble; in Pottiaceæ and Weissiæ almost nil; and strong in Mniaceæ and Hypnaceæ. There exists a curious relation between these optical properties and the amount of tannin contained in these membranes, the endostome of *Camptothecium lutescens* (Hypnaceæ) affording a particularly good illustration of this fact (*Ann. and Mag. Nat. Hist.*, p. 248.)

Genetic Affinity of Algæ.

In a paper read at the Linnean Society, on March 3, on "The Genetic Affinities of the Algæ," Mr. A. W. Bennett suggested that in many of the groups difficult to classify retrogression had apparently taken place in the form of suppression of development of either the vegetative or reproductive organs, the organs which predominated leaving the others degenerate. Thus the Desmids are considered to be a degenerate group, which should not be classed as hitherto with the diatoms. The views expressed in the paper are, however, likely to be critically discussed by continental cryptogamists.

Botanical Magazine.

The *Gardeners' Chronicle* (March 12, p. 345) gives an interesting sketch of the history of the *Botanical Magazine*, a publication which has just reached its hundredth year. In noticing the botanical publications before the founding of the *Botanical Magazine* the author quotes from the 'Grete Herball' of 1526, which is apparently the earliest English printed book containing figures of plants, a passage concerning rosemary, in which it is stated that the flowers of rosemary were called "anthos," and the electuary made of them "dyanthos" or "dendrolibanas." Under the name of "anthos" rosemary is enumerated as one of the simples in some of the earliest London Pharmacopœias.

Anthos.

Analysis of Pollen.

At a recent meeting of the Royal Horticultural Society, Professor Church communicated the result of some chemical examinations of pollen. He found that the proportion of nitrogen, potash and phosphorus pentoxide was about seven times greater in the pollen than in the leaf scales, corresponding with the more important functions of the sexual organs as compared with the merely temporarily protective scales. The dry pollen of *Cupressus fragrans* he found to yield 3·7 per cent. of ash, of which 100 parts contained as much as 20·14 of phosphoric acid and 35·34 of potash (*Gard. Chron.*, March 12, p. 358.)

Ustilago Phœnicis.

At the same meeting specimens of dates and figs affected by the black sooty spores of *Ustilago phœnicis*, Corda, and *U. ficuum* Rchdt, were shown. These are found as a rule only in the inferior qualities of the fruits. The fungus develops in the interior of the fruit. The occurrence of this fungus in any quantity might possibly prove deleterious to health if eaten by women, should the fungi be found to possess properties similar to that of *Ustilago maydis*.

New Plants.

The Journal of Botany for March gives an illustration of the new British plant *Equisetum littorale*, Kühlewein. It appears to be intermediate between *E. palustre* and *E. limosum*, differing from the former by the much larger central hollow of the stem, and by the more numerous and shallower furrows; and from the latter, by the smaller hollow, by the furrows being fewer and rather deeper, by its paler colour and, conspicuously, by the funnel-shaped uppermost sheaths. In the same journal a new Rubus is recorded by Mr. Linton, from near Sprowston (East Norfolk), which, in general aspect and mode of growth, resembles *R. Bellardi*, Weihe, frequent in some of the copses of that neighbourhood, but differs from it in the thinner armature and the glabrescence of the more angular barren stem; the glossy character of the upper surface of the leaf, particularly obvious on the barren shoots, suggested the name of *R. lucens*.

Kew Seed List.

The exchange list of seeds issued this year by Kew is an exceptionally long one, comprising forty-six pages, and compares favourably with the lists of other botanical gardens. The labour involved in getting up these lists and in distributing the seeds must be simply enormous. The list includes a large number of medicinal plants of this and other countries, and still more of economic plants. The names of the seeds are arranged alphabetically under their respective orders. The Kew Museum appears to have

Kew Museum.

gained considerably by the Colonial Exhibition last year, especially in timbers. A description of some of these acquisitions is given in the *Gardeners' Chronicle* (March 12, p. 351), among which may be noticed some of the Borneo timber, known as mirabon, which contains a blood-red astringent juice, hardening into a kino when exposed to the air. This timber is attributed to *Afzelia Palembanica*, and is considered to be the best timber tree of Malacca. Another timber possessing some pharmaceutical interest is that in which the Borneo camphor is found; of this wood a fine slab 12 feet high by 2 feet wide has been acquired by the Kew Musuem. A third object of interest is a plant of *Lyperia crocea*, the flowers of which are known as Cape saffron, from affording a dye similar in colour to saffron (*Gard. Chron.*, March 12, p. 351).

Palladium Amalgam.

The use of palladium for filling teeth is strongly recommended by Mr. W. A. Hunt in the *Journal of the British Dental Association*. The amalgam made with this metal is, he says, the most durable known, bearing wear and tear perfectly, and not being acted on by saliva. The only disadvantages attending its use are that where the filling is exposed to view it shows of a dark purplish black colour, and that its manipulation requires special care. The grey unoxidized palladium powder should alone be used. He remarks that although apparently more costly than gold (140*s*. to 147*s*. per ounce) it is much lighter, so that one ounce of palladium is nearly equal in bulk to two ounces of gold. By the few who recognize the value of this metal for dental purposes it seems to be extensively used, since it is said that a noted London

dentist has paid for palladium as much as £200 to £300 at a time for use in his own practice.

Artificial Rubies.

Many visitors to the Paris exhibition of 1878 will remember an interesting collection of artificial rubies exhibited by M. Fremy. These had been obtained either by heating together at a high temperature a mixture of alumina and minium, or a mixture of equal weights of alumina and barium fluoride, with a trace of potassium bichromate in each case to impart the rose colour. As earthern crucibles had been used in the operation it was then supposed that silica derived from them might have determined the crystallization of the alumina. This, however, has since been disproved in respect to the latter mixture, and numerous experiments made by M. Fremy in conjunction with M. Verneuil have demonstrated that nearly all the fluorides possess, to a remarkable degree, the property of determining at a red heat the crystallization of alumina (*Comptes Rend.*, civ., 738). Calcium fluoride, especially, appears to exercise over alumina an enormous power of mineralization; for when pure native calcium fluoride and pure alumina were calcined for some hours at a white heat in the same crucible, but separated by a platinum plate pierced with holes, the emanations from the fluor spar proved sufficient to cause the alumina to change its amorphous state and form a crystalline mass. In order, however, to prevent any "perturbation in the commerce of precious stones" being caused by this announcement, M. Fremy adds, in a footnote, that although the rubies obtained by this method are of fine colour, good shape, very distinct in crystallization, and in every respect more beautiful than previous products, they are still small, and therefore without commercial importance.

Phosphorescence of Calcium Sulphide.

The causes determining and modifying the phosphorescence of calcium sulphide, upon which the peculiar property of the so-called "luminous paint" is dependent, have been the subject of several recent investigations. It is pretty well known now that not only the intensity of the luminosity, but also the colour of the phosphorescence, varies under different conditions. Thus M. Verneuil found that a calcium sulphide occurring in commerce, remarkable for the intensity and duration of its purple phosphorescence, could be imitated by roasting together a mixture consisting of lime from a kind of mussel shell (*Hypopus vulgaris*), 100 parts, sulphur, 30 parts, and a trace of bismuth subnitrate; but when pure lime was substituted the product was only feebly phosphorescent (*Comptes Rend.*, civ., 501). Analysis of the shells showed that they consisted almost entirely of calcium carbonate, but contained also 0·99 per cent. of sodium carbonate, sodium chloride 0·06 per cent., silica 0·02 per cent., magnesia 0·01 per cent., and traces of phosphoric acid. Further experiment proved that the phosphorescence of the roasted mixture was due principally to the presence of the sodium carbonate and sodium chloride. Nevertheless when these were added to a mixture of pure lime and sulphur with bismuth subnitrate, in the proportions in which they had been found in the mussel shells, the product, although showing a beautiful phosphorescence, was inferior in luminosity. Upon doubling the proportions of the sodium salt, however, an equally brilliant product was obtained, and the more favourable result with the shell lime is attributed to the more intimate admixture of the constituents in the natural substance. Besides these original ingredients M. Verneuil evidently considers the final result improved by the formation of a little calcium sulphate during the roasting. Apparently all the active agents experimented with act as simple fluxes, and M. Verneuil thinks that any matter capable of vitrifying the surface of calcium sulphide without discolouring it will yield a very phosphorescent product; hence M. Verneuil also considers that the result is due to the influence of the foreign substances in producing a change in the molecular condition of the calcium sulphide, as originally suggested by M. Becquerel. In commenting upon this communication (*Comptes Rend.*, civ., 551), M. Becquerel mentions that an admixture of traces of potassium persulphide with calcium sulphide causes a very luminous green phosphorescence, manganese peroxide an orange-yellow phosphorescence, and lithium carbonate a brilliant green phosphorescence; but he points out that nevertheless the potassium, manganese and lithium sulphides are scarcely luminous, or not at all. Temperature also exercises a remarkable modifying influence over the colour of the phosphorescence. A preparation of calcium sulphide showing a green luminosity at ordinary temperatures has a blue phosphorescence at 100° C., which becomes a brilliant violet-blue between 200° and 300° C., but returns to green when the ordinary temperature is recovered. Still more remarkable in this respect is the behaviour of strontium sulphide prepared from caustic strontia and sulphur, which, after exposure to light, emits a violet-blue phosphorescence at – 20° C.; becomes light blue at +40° C., at 90° greenish-yellow, and at 150° C. orange; upon the temperature falling it resumes at each stage the characteristic tint.

A STUDY OF THE ALKALOIDS OF GELSEMIUM ROOT AND SOME OF THEIR CRYSTALLIZABLE SALTS.*

BY F. A. THOMPSON, PH.C.

Having occasion to examine several samples of gelsemium root (*Gelsemium sempervirens*, Aiton., Nat. Order, *Loganiaceæ*), I was led to suppose that there was more than one alkaloid present, and also to take up the investigation as far as time and appliances would permit, which I will say were far from being sufficient to establish the identity of the important constituents present.

I found no literature stating the possible presence of two alkaloids until, just after having finished my researches, I had an opportunity to consult Bentley and Trimen's work on Medicinal Plants, p. 181, and there found it stated that Ringer and Murrell were led to believe, from the physiological action of the drug, that it contained two alkaloids, one a paralysing and the other a tetanising agent. The first analysis of this drug, showing the presence of an alkaloid, was made by M. H. Kolloch in 1855, and since then there have been three examinations made by different chemists, Eberle (1869), Wormley† (1869), and Gerrard‡ (1883), showing also the presence of gelsemic acid, which I have considered of insufficient importance to investigate further than has already been done.

An elaborate botanical description of the root, and engravings of the same, can be found in the *Pharmaceutical Journal and Transactions*, 1875-6, vol. vi., by E. M. Holmes, Curator of the Museum of the Pharmaceutical Society, London.

* From the *Pharmaceutical Era*, January.
† *Amer. Journ. Pharm.*, 1870, p. 1.
‡ *Pharm. Journ.*, [3], xiii., 641.

Method of Extracting the Alkaloids.

The following method was found to be the most practical of the various ones tried:—

The drug, in fine powder, was thoroughly mixed with about one-sixth its weight of freshly slacked lime, and exhausted with strong alcohol.

The addition of the lime was considered an advantage in setting free the alkaloid from its combination with organic acids, thus rendering it more soluble in the strong alcohol, and also reducing the amount of extractive matter which is desirable in extracting the alkaloids.

The percolate was rendered slightly acid with dilute sulphuric acid, the lime removed as a sulphate by filtration, and the filtrate, evaporated to a semi-liquid, allowed to cool, and water added to this as long as a precipitate was produced. This was allowed to stand for twenty-four hours, when it separated into two strata, the upper being mostly gelsemic acid and the lower the alkaloids in form of a salt, which were easily separated by drawing off the liquid portion and washing the precipitate of organic acids with water. This solution was evaporated until only one pint represented about twelve pounds of the drug, and then washed with several portions of ether to remove as much gelsemic acid as possible, which is very troublesome to remove from the alkaloids.

The fluid containing the alkaloid was put in a suitable separating apparatus, and three or four times its volume of chloroform added and shaken for some time, which should remove most of the gelsemic acid. The chloroform solution was drawn off after completely separating, and to the original fluid the same amount of fresh chloroform was added. The alkaloids were now precipitated by the careful addition of a solution of alkali, and dissolved out by shaking with chloroform, this being done with great care to avoid the formation of an emulsion, which requires some time to again separate. The chloroform solution was drawn off and the alkaloids washed out by shaking with water, containing some sulphuric acid (hydrochloric acid will not answer), and in this way the same chloroform was used for washing out the entire alkaloids.

The solution of the alkaloids as sulphates was quite dark, due to the presence of the soft or second alkaloid and some foreign matter. To further purify the alkaloids they were again precipitated with an alkali, and dissolved out with ether, and from the ethereal solution were removed by shaking with water containing hydrochloric acid, converting the alkaloides into muriates. The gelsemine chloride, being quite insoluble in water, was deposited out upon standing, while the chloride of of the second alkaloid, being soluble in its own weight of water, was held in solution, and by filtering, the two alkaloids were fractionally separated. The gelsemine chloride was then further purified by repeated crystallization from hot alcohol, until a perfectly white crystalline salt was obtained.

The exact proportion of the alkaloids was not determined, but they were approximately estimated to be in the relative proportion of three of gelsemine to one of the soft alkaloid (gelseminine). The drug yields from ·15 per cent. to ·25 per cent. of total alkaloids.

Combustion of Gelsemine.

Obtaining the alkaloid in the form of a pure crystallized salt, I was able to extract the organic base in a pure state, and having it in this form I was anxious to study its ultimate composition, and so made several estimations of it by combustion, with the following results, viz.:—

	First estimation.	2nd.	3rd.	4th.
	Per cent.	Per cent.	Per cent.	Per cent.
Carbon .	66·00	65·90	67·50	—
Hydrogen.	7·35	7·05	7·27	—
Nitrogen .	5·77	5·82	5·73	5·66

The carbon and hydrogen were estimated by combustion with lead chromate, and the nitrogen by Will and Varrentrapp's method.

Calculating the oxygen by difference, the above figures allow the construction of the following chemical formula ($C_{54}H_{69}N_4O_{12}$) which theoretically requires 67·15 per cent. C, 7·15 per cent. H, 5·7 per cent. N, and 19·9 per cent. O.

Two estimations of the chlorine were made from the chloride, finding 10·3 and 10·1 per cent. calculated as hydrochloric acid; also the amount of alkaloid dried at 100° C. which was found to be 90 and 89·8 per cent. respectively, which concludes the composition of the salt to be $(C_{54}H_{69}N_4O_{12})(HCl)_3$, containing theoretically 89·81 per cent. alkaloid, and 10·19 per cent. hydrochloric acid. Three portions of the purified platinum salt of the alkaloid were submitted to ignition, with these results: 18·33, 18·51 and 19· per cent. of platinum, which allows the composition of the precipitate to be

$$(C_{54}H_{69}N_4O_{12})_2(HCl)_6(PtCl_4)_3,$$

containing 18·58 per cent. platinum.

Two estimations of the gold were made by ignition from the purified gold salt of the alkaloid, which was found to contain 29·5 and 28 per cent. respectively. This allows the composition of the salt to be

$$(C_{54}H_{69}N_4O_2)(HCl)_3(AuCl_3)_3,$$

requiring 26·7 per cent. of gold for its construction or composition.

The above results differ materially from those obtained by A. W. Gerrard,* which are as follows:—

	1st. estimation.	2nd.	3rd.	4th
	Per cent.	Per cent.	Per cent.	Per cent.
Carbon .	70·4	70·1	70·3	70·45
Hydrogen.	7·2	7·3	6·9	7·3
Nitrogen .	7·	7·3	6·9	—

Taking the oxygen by difference, his figures allow the construction of the following formula ($C_{12}H_{14}NO_2$), which, properly written, would be $C_{24}H_{28}N_2O_4$, as the first formula would show a division of an atom. Theoretically calculated, it contains 70·6 C, 6·86 H, 6·86 N, and 15·68 O.

His determinations of nitrogen were made by the absolute method of collecting the gas, and not by Will and Varrentrapp's method, but as my results agreed very closely, I felt warranted in accepting them as correct, from which all my calculations were made.

Gerrard also made estimation of the chlorine from the chloride, and found 8·1 per cent., showing the composition of his salt to be $(C_{24}H_{28}N_2O_4)HCl$, containing 7·96 per cent. chlorine; also the bromide was found to contain 16·21 per cent. $(C_{24}H_{28}N_2O_4)HBr$., and theoretically containing 16·3 per cent. bromine.

Purified platinum and gold salts he found to contain 16·7 and 36·9 per cent. respectively, pointing to the composition of the platinum salt as $(C_{24}H_{28}N_2O_4)(HCl)_2PtCl_4$, and the gold $(C_{24}H_{28}N_2O_4)HCl(AuCl_3)_2$, the former containing 16·09 platinum, and the latter 37·4 per cent. gold.

Gelsemine $(C_{54}H_{69}N_4O_{12})''' = 965$.

Properties.—A brittle, transparent, solid mass, crystallizing with difficulty from alcohol. According to Gerrard, the alkaloid fuses at 45° C. (113° F.) to a colourless viscid liquid, which, on cooling, solidifies to a transparent vitreous mass, and submitted to a higher heat it is entirely dissipated, from the fumes of which no crystals were produced on a cooled surface.

It is almost insoluble in cold water, requiring 650 parts for solution, even when digested with an excess for some time. From hot water it separates on cooling in a granular amorphous form. It has strong basic properties, completely neutralizing acids and forming crystalline salts, except the sulphate.

Gelsemine is freely soluble in ether, chloroform and alcohol, sparingly so in petroleum ether. One part of the dried alkaloid dissolves in about 25 parts of ether, and when freshly precipitated in about 10 parts.

It dissolves in concentrated sulphuric and nitric acids without colour, and solutions of its salts are precipitated by ammonia and fixed alkalies, which precipitates are soluble in excess of the reagents.

* *Pharmaceutical Journal*, [3], xiii., 642.

Ammonia precipitates the alkaloid as a white amorphous precipitate, which is soluble in excess of the precipitant, and if this solution be exposed to spontaneous evaporation, the ammonia will be eliminated, leaving the alkaloid in form of a crystalline salt.

Concentrated sulphuric acid and *manganic oxide* produce a *cherry red*, changing slowly to an olive green. This test is exceedingly delicate with the pure alkaloid, one milligramme giving a distinct reaction. Potassium bichromate produces a *deep red*, rapidly changing through a series of colours to a green; ceroso-ceric oxide gives a *deep crimson*, changing to a brown, finally becoming green.

The statement is made that gelsemine may be mistaken for strychnine (when tested with concentrated sulphuric acid and manganic oxide), if not compared side by side, but I have failed to notice any similarity between the two, gelsemine producing at once a *cherry red*, and strychnine a *deep blue*, passing at once to a purple, if the pure alkaloid be used. If the alkaloid gelsemine contains only a slight trace of the second alkaloid (gelseminine), the purple will be produced, as this alkaloid gives such a colour. (See reactions under gelseminine.)

Solutions of gelsemine.—Solutions of the salts of the pure alkaloid are colourless, and have a distinct bitter taste, which is marked with one drop of a solution of the alkaloid 1 : 1000.

Comparative Reactions ascribed to Gelsemine and Gelseminine.

Reagent.	Author.	Gerrard.	Sonnenschein.	Wormley.	Gelseminine (Author).
Concentrated sulphuric acid.	No reaction.	No reaction.	Yellow-green, passing to reddish-brown colour, and upon heating to deep red.	Dissolves with a red or brown colour, which, after a time, assumes a pinkish hue. Warmed, it acquires a chocolate or violet hue.	A light yellow colour.
Concentrated nitric acid.	No reaction.	No reaction.	Yellow-green colour.	Brownish-green, changing to a deep green colour.	A deep green colour
Concentrated sulphuric acid and manganic oxide.	Cherry-red, changing slowly to an olive-green.	Damask-red passing to green-blue.			A deep purple, fading slowly to a bluish-purple, the purple predominating.
Concentrated sulphuric acid and potassium-bichromate in crystals.	Deep red, changing through a series of colours to a green.	A crimson-red, evanescent redness passing to a green colour.	Cherry-red colour, changing a little to a violet, which soon forms a bluish-green spot.	Reddish-purple streaks along the path of the crystal.	Reddish-purple, fading quickly to yellow-green, finally becoming a green.
Concentrated sulphuric acid and ceroso-ceric acid.	A deep crimson, changing to brown, finally becoming green.				Reddish-purple, changing slowly to a purple colour.

Picric acid produces a yellow precipitate from a solution in 1 in 500, 1 in 1000 a greenish-yellow precipitate.

Iodine in potassium iodide throws down in moderately weak solutions a brown amorphous precipitate, sparingly soluble in acetic acid. A precipitate is produced in a solution 1 to 10,000 of the alkaloid.

Auric chloride produces a yellow precipitate, soluble in water, having the composition of

$$(C_{54}H_{69}N_4O_{12})HCl_3(AuCl_3)_3.$$

Platinum chloride precipitates from tolerably strong solutions a yellow precipitate, soluble in water. Its composition is $(C_{54}H_{69}N_4O_{12})_2(HCl)_6(PtCl_4)_3$.

Potassium mercuric iodide (Mayer's) produces white precipitate, sparingly soluble in water. This reagent is used in estimating the amount of alkaloids in the drug, as 1 c.c. of a N 1-20 solution precipitates 8·5 m.g. of gelsemine,* when diluted to the strength of 1 part of the alkaloid to 400 parts of water, containing ·2 per cent. of sulphuric acid.

Gelsemine Muriate $(C_{54}H_{69}N_4O_{12})(HCl)_3$; 1074·5.

Gelsemine chloride crystallizes from alcohol, or better from water, in groups of white acicular-shaped crystals, anhydrous, permanent in the air, and having a distinct but not a persistent bitter taste. Reaction neutral.

Not very soluble in water or alcohol, requiring 39 parts of water and 170 parts of alcohol to dissolve it. Insoluble in ether, petroleum benzin or chloroform. Solutions of the pure salt are precipitated by the fixed alkalies and ammonia, soluble in excess of the reagent. If a solution containing an excess of the ammonia be exposed to the air, the ammonia will be eliminated, leaving the salt in its natural crystalline form.

Solutions of the salt are precipitated by all the alkaloidal reagents, as stated under gelsemine.

Concentrated sulphuric acid produces no colour in the cold, and the same colour reactions as the alkaloid, with oxidizing agents.

Gelsemine Nitrate $(C_{54}H_{69}N_4O_{12})(HNO_3)_3 = 1154$.

This salt crystallizes from a hot saturated aqueous solution upon cooling, in distinct white six-sided rhombic prisms, some being terminated by a six-sided pyramid. Permanent in the air, anhydrous, and having a distinct, but not a persistent bitter taste, and neutral reaction. Soluble in 40 parts of water (59° F.) and 135 parts of alcohol. Insoluble in ether, petroleum benzin or chloroform. When heated on platinum foil the crystals fuse, finally becoming entirely dissipated.

Concentrated sulphuric acid and manganic oxide produce a *pinkish* colour remaining some time, finally becoming a pale green, which reaction is different from the crimson red, produced by the alkaloid or its other salts. Concentrated sulphuric acid produces no colour in the cold, and solutions of the salt behave to the alkaloidal precipitants the same as the muriate.

Gelsemine Sulphate $(C_{54}H_{69}N_4O_{12})_2(H_2SO_4)_3 = 2224$.

This salt is of a yellowish tint, non-crystallizable, permanent in air, and readily soluble in water. Further

* 'Pharmaceutical Assaying,' Lyons, page 94.

than this I have made no study of it, being unable to crystallize it.

Gelseminine or the Second Alkaloid.

This alkaloid differs greatly as to physical and chemical properties from gelsemine. Whether it differs in medicinal action is a question as yet, though I am inclined to believe that this acts as a tetanizing agent, and gelsemine as a paralysing agent, according to Ringer and Murrell's statement.

Not having been able to obtain this alkaloid in the form of a crystalline salt, I am not certain as to its being pure, though it must be comparatively so, being washed from ether solution to acid water several times. It is upon the alkaloid in this state that I made the examination as far as I did, and hope to have the time to study it further; if not I hope it will be taken up by someone who will complete the investigation. The alkaloid is of a dark brown, resinous mass, permanent in the air, but when broken up and powdered is of a yellow colour, quite bitter, resembling the taste of the root. Sparingly soluble in water, readily so in alcohol, ether and chloroform, and sparingly in petroleum ether. Has strong basic properties, completely neutralizing the acids, forming neutral amorphous salts.

Reactions in solid state.—When a small portion is added to concentrated sulphuric acid it dissolves, forming a light yellow colour, and when mixed with concentrated nitric acid produces a *deep green.*

Manganic oxide and concentrated sulphuric acid produce a *deep purple*, fading slowly to a bluish-purple, the blue predominating. *Ceroso-ceric oxide* produces a *reddish purple*, fading slowly to a light purple.

Potassium bichromate and *concentrated sulphuric acid* produce a *reddish-purple*, fading rapidly to a *yellow-green*, finally becoming green. *Strong hydrochloric acid* dissolves the alkaloid without further colour, forming a clear solution on diluting.

The muriate and sulphate of this alkaloid are, when dried, of a brownish, resinous nature. Soluble in less than their own weight of water; readily soluble in alcohol; insoluble in petroleum benzin, ether or chloroform.

Solution of the salts.—The solution of the salts of this alkaloid are a deep brown when concentrated, and yellowish on diluting.

Potassio-mercuric iodide (Mayer) produces a precipitate in a solution of 1 in 1000, sparingly soluble in water, and produces a distinct one in 1 in 20,000 of the salt.

Saturated solution of picric acid produces a yellow-white precipitate in 1 in 500 solution, and when diluted to 1 in 10,000 a slight greenish-yellow precipitate is formed.

Iodine in potassium iodide produces in 1 in 1000 a granular reddish-brown precipitate, 1 in 5000 a chocolate-coloured, and gives a distinct reaction when diluted to 1 in 50,000 of the salt.

Sodium phospho-tungstate produces a fine white precipitate in 1 in 1000, and 1 in 10,000 hardly perceptible.

Platinum chloride produces a brownish-yellow precipitate in moderately strong solution, and a portion purified was found, on ignition, to contain 18·3 per cent. platinum.

Tannic acid, a greyish-white precipitate, sparingly soluble in excess of the reagent; 1 in 10,000 produces a slight turbidity.

Ammonia and the *fixed alkalies* produce copious precipitates, somewhat soluble in excess of ammonia.

When the alkaloid was first discovered in 1855, the name gelseminia was given it; since at that time *Gelseminum sempervirens* was the name of the plant. The name having been changed since to *Gelsemium sempervirens*, the alkaloid has also been renamed gelsemine, though some works give gelsemia and gelseminia as synonyms.

As the drug heretofore was supposed to contain but one alkaloid, I have adopted the name gelsemine given it, as the name for my first or crystallizable alkaloid, and the name gelseminine (which has also been used by some for gelsemine), as the most desirable for the second or non-crystallizable alkaloid. These names at first might be thought to be somewhat confusing, but I think no more so than those of the alkaloids of cinchona bark.

Upon further study of the second alkaloid it may be proven that it is a derivative from the first during the process of extraction or by decomposition, or that it may be composed of more than one alkaloid. I hope it may be further studied by some one having more time than myself.

I will not enter into details regarding the medicinal action of this important drug, as different authors make different and even contradictory statements in regard to its use, which may be partially attributed to the prescribing of preparations varying in strength. It is used largely for facial neuralgia.

Having the constituents isolated, this trouble may be to a certain extent obviated, as they undoubtedly represent the medicinal action of the drug, and it only remains for physicians to take up the alkaloids and make a thorough study as to their physiological action and therapeutic properties.

Having performed my researches in the analytical laboratory of Parke, Davis and Co., it is to this enterprising firm that I am indebted for supplying drugs and chemicals, and would add that samples of the two alkaloids will be furnished by them to physicians for experiments.

A TEST FOR OIL OF PEPPERMINT.*

BY E. C. FEDERER, PH.C.

When the oil has been found by the iodine test to be free from fireweed oil, camphor oil or other fulminating oils (so-called weed oils) or by the chloral-sulphuric acid test to be free from contaminating pennyroyal oil, and if it is found soluble (without cloudiness) in 3 parts of 94 per cent. alcohol or 4 parts 85 per cent. alcohol, to show absence of resinified or old oxidized oil, and lastly if its odour is such, that experts pronounce the oil prime by previously confirming above tests, there may still be room for doubt as to its quality.

This doubt is based on the known fact of oils being placed on the market having all the appearance, transparency, solubility, freedom from fulminating oils, etc., and a fair good odour like that which a good oil possesses but for the abstraction of a part of its menthol.

A more expeditious, if not a more reliable test, would be acceptable than the freezing test, as this seems to be somewhat indefinite to such an extent in proportion as to how far or little the oil suspected has been dementholated, also as to quantity of oil to operate on, size of test tube, or amount of menthol required to start crystallization.

This refers to Fritsche's test, as this requires addition of menthol for a nucleus towards hastening congelation; no particular quantity is specified, nor is there any definite quantity of menthol used, simply four or five crystals, or whether they should be small or large or mixed in sizes. It would seem that a small quantity of oil quite thoroughly dementholated, with five fair-sized crystals added, might appear to be very rich in menthol when reinforced by that it may still retain through partial dementholation, and quickly congeal to a solid mass alongside of a better oil, but in a little larger quantity, with only four *smaller* sized crystals added. This test made on known partially dementholated oil alongside of one of good quality and pure oil, with the result in favour of that which was partially dementholated, which became solid in fifteen minutes, the better oil only partially solidifying in this time, and to become approximately as solid as the poorer kind required as much as twenty-three minutes.

If the menthol is regarded to be a camphor, an alcohol or body having weak acid property, it would seem that a test might be applied which would at once be found accu-

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* From the *Pharmaceutical Era*, February.

rate, definite, and at all seasons convenient. On this principle were the ideas based for procuring a test.

Assuming that menthol is capable of being acted on by alcoholic potash solution in such a way, when an oil containing menthol is mixed with a due quantity of such a solution of a requisite percentage of the alkali and time allowed for the reaction, then a quantity of water added should hold in solution the so formed (in theory) menthol-potassium, allowing *menthene* to separate with or without some or all the alcohol.

Theorizing this way, a great many experiments were made, until it was found better to hit upon some definite quantity of test material in definite proportions; therefore a reagent was prepared by dissolving 1 part by weight of white potassic hydrate (in sticks) in 9 parts by weight of 94 per cent. alcohol and filtered through absorbent cotton.

When 1 part of good oil peppermint containing the normal quantity of menthol as it usually is found to be in natural oil is mixed with 2 parts of the alcoholic potash solution, and in a few minutes (say ten) afterwards 1 part of water at 40° F. is added (parts by volume), there will be a separation of 2 equal parts, *i.e.*, 10 c.c. oil pure + 20 c.c. sol. KOC_2H_6OH + 10 c.c. HOH = 20 c.c. upper layer + 20 c.c. lower layer.

If menthol is added to pure oil, and the oil so enriched is mixed with the above reagent and water added in the above proportions, there will be a *larger* supernatant layer in proportion as there is more free menthol added.

If dementholated oil is so treated the substratum becomes so large, that if no menthol at all were present it would leave only the menthene to separate and free itself from the alcohol, water and potassic hydroxide, which would form a 25 per cent. supernatant and a 75 per cent. lower layer, conjecturing this from what the effect has been found to be, and believing menthene to have the same general properties as to solubility, etc., as terpenes, or oils very rich in terpenes.

If any other oil be mixed with the pure oil, *e.g.*, oil of camphor, dementholated oil, in proportion to such present, so much less in proportion of the 4 parts will the supernatant layer be than 50 per cent. or 2 parts.

If dementholated oil be mixed with a due proportion of supermentholated oil, *i.e.*, dementholated oil + free menthol added, and subjected to above test, the quantities can be made so in proportion to each other that an equal separation occurs as in the pure natural oil.

So many tests, as above, were made in as many and varied forms as possible (considering the time at disposal for this work) that when the mixtures were all united, 420 c.c. were found to be the total volumes; of this 25 per cent. or 105 c.c. was the oil operated on, and consisted of dementholated, natural and supermentholated oil as well as adulterants (purposely added), etc., 25 per cent. water or 105 c.c., and 50 per cent. alcoholic potash solution or 210 c.c.

Deeming this a good hint towards finding a test, it was thought well to examine those layers separately. Having used the above said mixed oils, some below and others above, as well as some of natural or normal menthol-containing oils, the layers balanced each other as they do when pure oil alone was used, *i.e.*, the layers were equal in value (210 c.c. each).

By very careful distillation the alcohol was nearly all separated from the lower layer; this deducted from the full quantity of both layers gave the quantity from the supernatant layer.

The lower layer would contain all the potassic hydroxide and was estimated as potassic bitartrate in 47 per cent. alcohol, with excess of tartaric acid; it contained but *about* 2 per cent. of oil, thick, dark, and somewhat resinous, probably through being acted on somewhat by heat, water and potassic hydroxide, also possibly through the presence of resin in the oils forming resin soaps with the alkali.

The upper layer would contain no potassic hydroxide nor any salt of that base, confirmed by tartaric acid and much better by the colourless Bunsen's gas flame test, as it imparted no colour to any part of the flame whatever; this confirms the statement above as to potassic hydroxide.

Upper layer contained a little less than 105 c.c. of the oils or nearly all in both layers. The following is a concise statement of found substances :—

Each layer contained	.	210 c.c.
Lower „ „	.	70 c.c. 94 per cent. alcohol.
Upper „ „	.	140 c.c. 94 „ „
Both together equalled		210 c.c. or half (50 per cent.) of the whole mixture.

Lower layer contained all the KOH.
Upper „ „ nearly all the oils.

By this will be seen that peppermint oil or its menthol has a stronger affinity for alcohol than it has for potassic hydrate, showing that it gives this base up to water, when added in those proportions, and even when twice to four times the volume of the original quantity of water is added it seems to seize upon and hold on to a certain proportion of that alcohol. The potassic hydroxide totally separates from it, as it does from phenol potassium when it is thrown into water.

This suggests the thought that the test could be made more inexpensive, less troublesome and much simpler by far, by dropping the use of alkali altogether and using 94 per cent. alcohol alone, after which, water in its proportion could be added as before.

It has been, no doubt, noticed before by a great many persons who handle oil of peppermint in a pharmaceutical way that the oil will mix perfectly clear with a certain amount of alcohol, and that if the quantity of alcohol be further augmented, it becomes cloudy up to very milky. Some years ago (1871–1872), it was noticed by the writer, and in those days those associated with him as fellow clerks as well as himself, that oil peppermint was capable of *dissolving* a certain percentage of alcohol, and for alcohol to dissolve the oil it required a much larger quantity of the alcohol. This would seem to be another analogy of menthol to phenolpotassium, as far as the miscibility of the latter with water is concerned, or for that matter it may be likewise said of phenol alone.

The following is the mode of performing the experiments as per the table, and lead to those results tabulated when exact conditions are observed.

Into a graduated cylinder, divided into cubic centimetres and holding 40 to 5 c.c., place 10 c.c. of the oil, and add 20 c.c. 94 per cent. alcohol; shake well, then add 10 c.c. of water, which should be below 60° F. (ice water if at hand in summer); shake well and give time to fully allow of separation.

It might be well to suggest, on account of this affinity of oil of peppermint to seize upon alcohol, and hold it in the presence of water *in due proportion*, to call the test the "*mentholalcoholate test*," believing this name to be as justly applicable to this mixture as the name chloral alcoholate is to the mixture of hydrate of chloral in alcohol with presence of water.

In studying the table, note the following numbers (to show the affinity of oil of peppermint to alcohol in presence of even 2 to 4 parts of water).

Nos. 1, 2, 3, and 4, also particularly No. 25, then Nos. 26, 27, 28 and 29.

And as opposed to this the following numbers showing no alcohol absorption, Nos. 6, 7, 8, 9, 10, 16, (17), 41, 42, 43.

When two or more separate mixtures containing oils of great variances in their properties were mixed in the regular proportions, and their behaviour resulted alike, there was more water added in multiple proportion till the different effect was produced. Again when 2, 3, 4, or more volumes (1 vol. = 10 c.c.) of water were added to pure oil mixtures, or supermentholated mixtures, it was intended to show how tenaciously the alcohol was held by the said oil till water predominated so much as to act as solvent on the oil, thereby disrupting the mentholalcoholate combination.

Tabulated List of Separations, using Water in different Multiple Proportions and in all cases 20 *c.c. Alcohol and* 10 *c.c. of the Variously Mixed Oils, Pure and Otherwise.*

No.	Oils, 10 c.c.	Amt. water.	Upper separation.	Lower separation.
1	Pure ol. menth. pip.	10	14 c.c. clear oily	26 c.c. slightly milky.
2	„ „ „	20	14 „ „	36 „ more „
3	„ „ „	30	14 „ „	46 „ „ „ still.
4	„ „ „	40	14 „ „	56 „ „ „ „ The supernatant layer was slower in forming, and the line of separation just barely observable.
5	„ „ „	50	2 c.c. oily layer	Very milky.
6	Oil camphor vol. alone	10	35·5 c.c. very milky	8·5 c.c. clear oily.
7	„ „ „	20	32 „ „	8 „ „
8	„ „ „	30	Large globules oil floating on top, with smaller globules suspended about equally throughout	
9	Oil hedeoma alone	10	10·5 c.c. oily layer	29·5 c.c slightly milky.
10	„ „	20	10·5 „ „	39·5 „ more „
11	2·5 c.c. hedeoma 7·5 c.c. m. pip. opt.	10	13 „ „	27 „ slightly „
12	1 „ erigeron 9 „ „	10	13 „ „	27 „ „ opalescent.
13	1 „ „ 9 „ „	20	12·5 „ „	37·5 „ „ „
14	2·5 „ camph. oil 7·5 c.c. „	10	12·33 „ „	27·67 „ „ milky.
15	2·5 „ „ „ „	20	12 „ „	38 „ „ „
16	5 „ „ 5 c.c. „	10	10 „ „	30 „ „ „
17	Dementholated „	10	12 „ „	28 „ more „
18	„ „	20	12·5 „ „	27·5 „ slightly „
19	2·5 c.c. dementholated 7·5 c.c. „	10	13 „ „	27 „ „ „
20	2·5 „ „ 7·5 „	20	13 „ „	27 „ „ „
21	5 „ „ 5 „	10	12 „ „	28 „ „ „
22	5 „ „ 5 „	20	12·5 „ „	27·5 „ „ „
23	7·5 „ „ 2·5 „	10	13·5 „ „	26·5 „ „ „
24	7·5 „ „ 2·5 „	20	13 „ „	27 „ more „
25	Pure oil, with 50 p.c. added menthol	10	Perfectly clear mixture	No separation.
26	„ „ 50 „ „	20	Somewhat milky mixture	„ „
27	„ „ 50 „ „	30	14 c.c. clear oily	46 c.c. slightly milky.
28	„ „ 50 „ „	40	14 „ „	56 „ more „
29	„ „ 25 „ „	10	14 „ „	26 „ separation of white (menthol)
30	„ „ 25 „ „	20	13·5 „ „	26·5 „ same as above.
31	5 c.c. dementhol, 5 c.c. pure, with 50 per cent. menthol	10	13·5 „ „	26·5 „ slightly milky.
32	5 c.c. dementhol, 5 c.c. pure, with 50 per cent. menthol	20	12 5 „ „	37·5 „ „ „
33	7·5 c.c. dementhol, 2·5 c.c. pure, with 50 per cent. menthol	10	11·33 c.c. oily layer	28·67 „ „ „
34	7·5 c.c. dementhol, 2·5 c.c. pure, with 50 per cent, menthol	20	12·33 „ „	37·67 „ „ „
35	2·5 c.c. dementhol, 7·5 c.c. pure, with 50 per cent. menthol	10	17·5 „ „	22·5 „ „ „
36	2·5 c.c. dementhol, 7·5 c.c. pure, with 50 per cent. menthol	20	14·5 „ „	35·5 „ more „
37	2·5 c.c. dementhol, 7·5 c.c. pure, with 50 per cent. menthol	30	14·5 „ „	45·5 „ „ „
38	2·5 c.c. dementhol, 7·5 c.c. pure, with 50 per cent. menthol	40	13·5 „ „	56·5 „ slightly „
39	6 c.c. dementhol, 4 c.c. pure, with 50 per cent. menthol	10	14 c.c. separates very slow	26 „ „ „
40	6 c.c. dementhol, 4 c.c. pure, with 50 per cent. menthol	20	14 „ „ „	36 „ more „
41	Ol. menth. vir., pure, alone	10	Very milky all through, with a few globules of oil floating.	
42	5 c.c. menth. vir., 5 c c. menth. pip. opt.	10	11 c.c. separates clear	29 c.c. slightly milky.
43	25 c.c. menth. vir., 75 c.c. menth. pip. opt.	10	12·5 „ „	27·5 „ „ „
44	10 c.c. menth. vir., 90 c.c. menth. pip. opt.	10	12 „ „	28 „ „ „
45	10 c c. menth. vir., 90 c.c. menth. pip. opt.	20	12·5 „ „	37·5 „ „ „

The Pharmaceutical Journal.

SATURDAY, APRIL 2, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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INSTITUTE OF CHEMISTRY.

IT is now little short of two years ago that a Royal Charter of incorporation was granted to the Institute of Chemistry, and the circumstance was mentioned in this Journal as one of importance, not only for those more especially engaged in the pursuit of chemistry as a profession, but also in regard to those industrial occupations which involve a knowledge of chemical science. In pursuance of the power conferred by the Charter of incorporation it became the business of the Institute to frame bye-laws for regulating the conduct of its affairs, which were to be approved by the Privy Council. The execution of this work has occupied a considerable time, and it was only at the end of February last that the formal approval of the Privy Council was accorded to the bye-laws made by the Institute in general meeting. The time that has been taken up in the consideration of various suggestions and requirements put forward by the Privy Council before arriving at this result cannot be regarded as unprofitably employed, since the careful criticism to which the bye-laws have been subjected has resulted in their greater consistency and fitness for the objects in view. In the address delivered on the 14th of this month by Dr. ODLING, the President of the Institute, this view of the matter was put forward by him as compensating for the delay that occurred, and in a general way he stated that while the representations and requirements of the Privy Council were on most points advantageous and called for, the counter representations on other points were eventually acceded to by the department in a spirit of consideration demanding thankful and hearty acknowledgment. We are pleased to be able to congratulate the members of the Institute upon this satisfactory settlement of a somewhat arduous negotiation, and to join in the anticipation of the President, that from this time forward, favoured by its Royal Charter, acting now for the first time under its own bye-laws, with a smoother course before it, its new career may have more hopeful prospects than ever yet lay before it.

In the course of the presidential address, Dr. ODLING said, that though the provisions of the Charter and the bye-laws conferred upon the Council of the Institute considerable powers, the Council constituted only the chosen executive of the entire body, and that in reality the members at large were, in fact, responsible for the general policy of the Institute, and the regulation of its affairs. Hence he urged that it was the duty of all engaged as professional chemists to interest themselves in the welfare of the Institute, and make its now completed organization serviceable to good ends. That opportunity was afforded for active participation in such work was shown by reference to the constitution of the Institute, and the provisions for electing the executive body. While continuity in any course of action pursued by the Council is provided for by the circumstance of two-thirds of its members being eligible for re-appointment at each successive general meeting, desirable renovation of the Council is provided for by the circumstance of the whole of its members vacating office every year, by one third of the old members being ineligible for re-appointment, and by the official nomination of one-third of the new members being left in the hands of the general body. But with all these provisions for adequate and efficient representation no satisfactory result can be looked for without the hearty and continuous co-operation of the members at large. That will always be essential in order to make the Council for the time being of such power as the executive of a representative body that it will be able to carry out the work requisite for advancing the general interests of that body. More especially will such co-operation be needed in the earlier days of the Institute, and though it is the future of the profession that will be chiefly benefited, the claim of the Institute to support should be recognized by those already in practice, out of regard for the profession of which they are members. In any case, though it may happen that the action of the Council may not have the approval of individual members of the Institute, it will be clearly the fault of the general body if the course of action of the Council is not in accordance with prevailing wishes.

The concluding portion of Dr. ODLING'S address was devoted to a reply to the objection which has been raised to the combination of professorial work with that of professional chemistry. This objection has been put forward under the influence of an exaggerated admiration for "original research," as being the only pursuit worthy of the consideration of "all true men of science." This is a claptrap sentiment that is apt to be too readily accepted by a public having little appreciation, or even comprehension, of what scientific work really is, and probably no little mischief has been done by dilettante philosophers who propagate this notion; but the Institute of Che-

mistry may be looked to as calculated to establish a more rational estimate of chemical work, and be a means of proving that there is as wide a scope for the useful application of the knowledge we possess as there is for adding to what we already know by fresh discoveries. Dr. ODLING ably advocates the association of professional occupation with professorial work, and most of the arguments he makes use of are sound. According to him professorial teaching, and even investigation, gain from occasional engagements of the professoriate in various branches of professional work, and it would be a disadvantage to the large interests confided to professional chemists if they were precluded from obtaining the services of eminent professors, while at the same time it would be a hardship on professional chemists to be prevented from such co-operation. But Dr. ODLING, like a skilful advocate, confines his argument to those points which admit of being safely maintained, and he omits to deal with some objectionable features of the association of the professorial and professional occupations of chemists, for the reform of which it may be hoped there is now some prospect through the intervention of the Institute of Chemistry.

PRESENTATION TO MR. STEPHENSON.

WE have much pleasure in recording the presentation to Mr. J. B. STEPHENSON, which is reported on a subsequent page of this Journal, as having been made by his friends and colleagues in acknowledgment of his services to pharmacy in Scotland. Such a manifestation of esteem appears but natural, when it is remembered that Mr. STEPHENSON has not only been active in promoting the interests of pharmacy during a period of nearly thirty years, but that on the death of Mr. JOHN MACKAY he came forward and undertook to fill the difficult and perplexing position of acting as his successor. The value of his services in this and other capacities was acknowledged in a highly complimentary manner on the occasion of the presentation last week, and it is especially satisfactory to notice, in regard to recent arrangements for the conduct of the Society's business in Scotland, they are so far approved of by Mr. STEPHENSON, that he is clearly of opinion it would have been unwise not to have accepted the settlement offered by the Council of the Society.

The scheme for the Colonial and Indian Exhibition included provision for the preparation of reports on the exhibits, and in accordance with the request of Sir P. Cunliffe Owen, the Council of the Society of Arts having undertaken to superintend the preparation and issue of those reports, the names of persons qualified to prepare them were submitted to H.R.H. the Prince of Wales for appointment by him to carry out the work. These reports have now been published in the form of an octavo volume of about 500 pages. The subjects of them are mining industries; minerals and gems; meat and dairy products; grain, fruits, tea, coffee, cocoa, sugar; wines, spirits, beer, etc.; tobacco; drugs, chemical and pharmaceutical products; oils and fats; gums, resins, etc.; cotton; wool; silk; fibres; leather, fur, hides and tanning materials; timber; machinery; musical instruments. These reports comprise a vast amount of information relating to Colonial produce and manufactures that will be especially useful in the compact form it is presented, and the volume will be a convenient record of the exhibition. It is published by Messrs. Clowes and Sons at the price of 10*s.* 6*d.*

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On Monday evening the Pharmacy Acts Amendment Bill was introduced in the House of Commons and read a first time. The second reading was set down for Thursday, but meantime Dr. Tanner gave notice of his intention to move that the second reading be postponed for six months.

* * *

Another instalment of the useful series of reports on injurious insects, prepared for the Agricultural Department of the Privy Council by Mr. C. Whitehead, has just been issued from the Stationery Office. It contains verbal and pictorial descriptions of twenty-two insects that are considered to be the chief offenders in respect to root crops and the food vegetables that are usually grown on a large scale by market gardeners.

* * *

According to the *Pharmaceutische Zeitung*, picrate of ammonium is now being recommended in Germany, as it was a few years ago in this country, in the treatment of malaria, it being alleged to be even more efficacious than quinine. The pill form is preferred for its administration, one gram being usually ordered to be divided into 30 pills. In view of the possibility of such prescriptions making their appearance in pharmacies, a timely reminder is offered that picric acid and the picrates, especially picrate of ammonium, are readily and violently explosive, and it is recommended that before proceeding to mix the picrate of ammonium with the other ingredients of the pills, it should be moistened with a little water.

* * *

In a recently issued consular report on the finances of Japan it is stated that the tax on druggists in that country produces an annual revenue equal to £59,271.

* * *

Mr. Arthur Pearson Luff has been appointed to the Chair of Medical Jurisprudence and Toxicology in St. Mary's Hospital Medical School.

* * *

At the meeting of the Chemical Society on Thursday next, the 7th inst., a paper is to be read entitled "Researches on the Constitution of Azo- and Diazo-derivatives; Diazo-amido Compounds." Part II. By R. Meldola, F.R.S., and F. W. Streatfield.

* * *

A meeting of the Chemists' Assistants' Association will be held on Wednesday, April 6, when a paper on "The Analysis of Urine," by Mr. J. E. Saul, will be read.

Presentation to Mr. J. B. Stephenson.

A few of the friends and colleagues of Mr. J. B. Stephenson, Edinburgh, having thought the present time a suitable opportunity for presenting him with some acknowledgment for his services to pharmacy in Scotland, met for that purpose at a cake and wine banquet in the House of the Pharmaceutical Society, 36, York Place, Edinburgh, on Wednesday, March 23, at 4 p.m.

The chair was occupied by Mr. H. Bellyse Baildon, and Mr. William Ainslie acted as croupier.

Letters of apology for absence were received from Messrs. Buchanan; Borland, Kilmarnock; Dott; Finlay; Frazer, Glasgow; Gibson, Leven; Hardie, Dundee; Henry; Heron; Kinninmont, Glasgow; Maben, Hawick; MacDonald; MacEwan, London; Paton; Seath, Dunfermline; Smith; Storrar, Kirkcaldy; Strachan, Aberdeen; Symington; and Thompson.

The Chairman on rising to make the presentation said: I have had to preside on various occasions, but on none have I done so with such confidence in the goodness of my cause, as when I am asked to perform the duty of requesting Mr. Stephenson to accept this presentation from his admiring friends in Scotland. It requires no words of mine to make known to you his eminent services to pharmacy in Scotland. As early as the year 1859, we find him taking a prominent part in the evening scientific meetings of the Pharmaceutical Society in Edinburgh, and from that time to this, with a short interval, the Pharmaceutical Society has been indebted to him for his able support. In the year 1861 he became a member of the Council of the North British Branch, and, in company with Messrs. Ainslie and Young, rendered valuable services as a member of the Library and Museum Committee. In the year 1863 he was elected a member of the Board of Examiners, a position which he occupied for two years, and again he was proposed in 1876 to fill the vacancy caused by the retirement of Mr. Buchanan. In the spring of 1877 he was chosen President of the North British Branch. This office he held till the year 1882, a tenure of which there is no similar record in the history of the Society in Edinburgh. I need hardly remind you that he was the man to whom we all looked at that crisis in our affairs on the death of the lamented Mr. John Mackay. I can well remember that almost dramatic meeting on the very day of our departed friend's death, when at our unanimous request Mr. Stephenson consented to come forward and occupy the difficult and perplexing position which our great loss had brought about. The diligence and efficiency with which Mr. Stephenson has discharged the duties of the office of Honorary Treasurer, which he has held from that time till now, are well known to us all. In accordance with the recent arrangement for the management of the Society's business in Scotland, it has happened that I have in a sense been called upon to fill his shoes, and I cannot refrain from acknowledging the great courtesy and kindness which Mr. Stephenson has shown to me in a somewhat difficult position. You are also well aware of the important services Mr. Stephenson has rendered as a member of the Board of Examiners, in which he has filled the office of Chairman since 1877 with signal ability. We have another important testimony to his pre-eminence as a Scottish pharmacist, in his selection for the honourable position of President of the British Pharmaceutical Conference at Aberdeen in 1885. I need not detain you further. Knowing as I do, the untiring devotion and assiduity with which Mr. Stephenson has striven to promote the interests of pharmacy in Scotland, it gives me great pleasure to act as your mouthpiece on this occasion in asking him to accept, from his personal friends, this tangible expression of their appreciation of his services, and of their admira- for him as a model pharmacist.

Mr. Ainslie said he could add little to the very appropriate remarks of the Chairman, but as one of the oldest friends of Mr. Stephenson, he would like to say a few words on the present occasion. He was very pleased to see the cordial way in which the friends and colleagues of Mr. Stephenson had responded to the suggestion of which he might say he was the originator. There was one important service rendered by Mr. Stephenson which the Chairman had not referred to. That was the framing of the Edinburgh price list, which had been of great service to the whole trade for many years. He felt deeply indebted, also, to Mr. Stephenson for the splendid service he did in coming forward and keeping them moving, when, by the death of their lamented friend, Mr. Mackay, they were brought almost to a standstill. He trusted Mr. Stephenson would long be spared to wear this present, and that it would be handed down to his successors as an heirloom and a memorial of the highest respect of his brother pharmacists.

Mr. Gilmour said he had no intention of speaking, but as a member of the Board of Examiners in Scotland he would like to state in a sentence his cordial concurrence with every word of respect and esteem which had been expressed.

The Chairman then handed to Mr. Stephenson a handsome gold watch and appendages, the watch bearing the following inscription :—"Presented to J. B. Stephenson, Esq., by a few friends, in recognition of his valuable services to Pharmacy in Scotland, March 1887;" and also a gold bracelet set with pearls for Mrs. Stephenson.

In returning thanks Mr. Stephenson said: I am sure you will believe me when I say that I find it no light task to respond to the many things that have been said, and to this mark of your generous appreciation. I confess I can find no terms adequate to express myself, but I am deeply sensible of the great honour you have conferred upon me. I can faithfully promise to wear this gift very near my heart, both figuratively and literally. I have found that from the fact of my declining to be put in nomination for the recently elected Executive of the North British Branch, some of my friends have had some idea that I was inclined to play the part of Achilles sulking in his tent. That is really not so, and I am clearly of opinion that it would have been highly unwise not to have accepted the settlement offered by the Council of the Society. I am prepared to admit that through force of circumstances I have been called to take a prominent place in Scottish pharmaceutical affairs. That, I believe, has been largely due to my dear friend. the late Mr. Mackay, whose inspiration prompted me to labour with all my might for the advancement of the interests of pharmacy. Of any success I may have had

it is not for me to speak. All I can say is that I have honestly done my best. In this handsome gift, with which you now present me, I recognize an expression of your esteem, such as I never could have hoped for.

Mr. Watt, Haddington, said he had much pleasure, in the name of provincial pharmacists, in expressing their cordial concurrence in the presentation of this small mark of respect. In his intercourse with Mr. Stephenson, he had found him to possess many qualities which made him a wise and excellent councillor. He thought their doings that day would tend to bind them one to another, and there were many reasons at the present time why they should be united as one man. He proposed a hearty vote of thanks to Messrs. Ainslie, Baildon, Buchanan, Gilmour, and Kinnimont, who had kindly performed the duties of a Committee for the subscribers.

The vote was acknowledged by Mr. Baildon, who said their work had been a labour of love.

Mr. Nesbit, Portobello, said it gave him much pleasure to have this opportunity of showing his appreciation of the valuable services rendered by Mr. Stephenson. He had to propose a vote of thanks to Mr. Hill for the ready assistance he had given the Committee in carrying out their arrangements.

Mr. Hill acknowledged the vote.

Mr. Stephenson said he had the best reasons for proposing a hearty vote of thanks to Mr. Baildon for the able way in which he had discharged the duties of the chair on the present occasion.

Mr. Baildon, in acknowledging the vote, said it was one of the most agreeable duties he had ever been called upon to perform.

The meeting then closed.

Proceedings of Societies in London.

ROYAL INSTITUTION.

Colours of Thin Plates.

On Friday, the 25th ult., the Right Hon. Lord Rayleigh delivered a lecture at the Royal Institution upon "The Colours of Thin Plates," a term which he explained was applied to thin films of substances, such as oily films on the surface of water, or the equally familiar soap-bubble. Although the reflection of colours from the surface of a soap-bubble is probably the most noticeable, yet the "plate" which lends itself most readily for experiment is a film of air confined between two sheets of glass If a ray of white light be reflected from the surface of the film upon a screen, the so-called Newton's rings, a series of coloured concentric rings, are obtained. If, instead of reflected light, the ray of light transmitted through the film of air be allowed to fall upon the screen the same phenomenon is observable, but the effect is very considerably minimized, owing to the great preponderance of white light, which overlays as it were the coloured rings. Even in the first instance, as the lecturer was able to show later on, the colours are not nearly so intense as they may be obtained, owing to some white light being reflected from the surfaces of the two sheets of glass. With regard to the appearance of the phenomenon it is observed that the part which corresponds to the thinnest part of the film is considerably darker than the rest of the spectrum; around this is a bright ring of white, succeeded by constantly increasing concentric rings of different colours apparently repeating themselves. Lord Rayleigh also obtained the same results with a film of a solution of soap and glycerine, but in this case the dark portion was observed at the top of the spectrum, the other colours arranging themselves in order in the soap film thinned by the force of gravitation, thus showing that the colours vary according to the thickness of the film. Another form of the experiment called forth a considerable amount of applause from the audience. Lord Rayleigh caused a gentle stream of air to play obliquely upon a soap film, so that the part struck was moved forward and the whole film rotated. Then with the alteration of the force of the current of air, which of course regulated the centrifugal force, alternating thicknesses of film were obtained, causing a varying display of beautiful colours and combinations of colours. This last experiment also tended to prove that the bands of colour are not arranged in a certain order, but vary according to the thickness of the film, a conclusion arrived at by Brewster, who observed that if a film reflecting certain colours be carefully inverted so as not to disturb the gravity, the colours reflected are also inverted. Lord Rayleigh explained the phenomenon by referring to Young's wave theory of light. He regarded the film as having two surfaces from which light is reflected, an anterior exterior surface and a posterior interior surface. If a ray of light be thrown upon the film, a part of the light is reflected from the first surface, but the greater part is transmitted, and some of this is reflected from the second surface, passes back through the film, and is combined with the light reflected from the first surface. If then the light reflected from the second surface be in the same state of vibration as that reflected from the first surface, the effect of their combination will be to increase the amount of light reflected from the first surface, but if otherwise, the effect will be a partial neutralization of the light reflected from the first surface. That is to say, if the retardation of the light which is reflected from the second surface, owing to its twice traversing the thickness of the film, be equivalent to a wave length of the vibration of the light, it will increase the intensity of the light reflected from the first surface. If, however, the retardation be only equivalent to half a wave length, the intensity of the light will be decreased. Thus, then, with a ray of monochromatic light it will be seen that the effect of difference in the thickness of the film will be to alter the intensity of the reflected ray, but with a white light composed of several colours the result will be more complicated. As each colour has a different wave length in vibration it will be seen that each colour will act independently of the others, and a certain thickness of film which, upon the combination of the two reflected rays, will cause one particular colour to be intensified, will at the same time cause the other colours to be more or less obscured. Thus as the thickness of the film is altered different colours preponderate, causing the appearance of rings or bands, according to the nature of the experiment. The dark appearance on the screen corresponding to the thinnest part of the film is probably due to refraction of the ray of light reflected from the second surface, consequent in its passing from a rare into a denser medium, and again from the denser medium into the rare, which refraction Lord Rayleigh considers to effect a retardation equivalent to half a wave length. Lord Rayleigh supported this theory of the formation of Newton's rings by several interesting experiments. A beam of light was intercepted by two of Nicol's prisms, one of which acted as a polarizer and the other as an analyser of the light, so that no light was able to pass through both on to the screen. Between the two prisms a double refractive lens was now placed, in this case a double concave lens of selenite, when the same series of concentric rings observed with the film of air was obtained on the screen, only much more intense, whilst a wedge of selenite gave the bands of colour in the same order as with the soap bubble. But perhaps the most striking proof of the dependence of the colours upon the thickness of the film was shown by the reflection of a beam of light from a piece of mica, composed of twenty-four very

attenuated plates overlapping each other. With each layer a marked gradation in colour was visible. The remainder of the lecture was devoted to an explanation of the determination of the chromatic relations of the colours of the spectrum. Lord Rayleigh at this point made a rather startling statement that any colour can be produced by two other colours. As an example of such a formation a ray of white light was passed separately through a solution of yellow chromate of potash and an alkaline litmus solution, throwing respectively a yellow and violet-blue colour upon the screen. When the ray was made to pass through the two solutions successively, an orange-yellow colour was obtained upon the screen, which colour Lord Rayleigh asserted to be made up of red and green rays. To prove this the ray of white light was decomposed by means of a prism, and the decomposed rays passed through the two solutions. The one solution was found to exclude all the yellow and orange rays from the spectrum, whilst the other excluded all the blue and violet rays, so that when the ray had passed through both solutions only the red and green rays were left. If instead of allowing the decomposed ray of light to pass through a slit and thus obtain definite bands in the spectrum, the ray was passed through a circular hole, the red and green colours overlapped each other on the screen, forming by their combination the identical orange-yellow colour obtained with the primary white light. It was then stated that if three definite positions be taken in a spectrum in the red, green, and violet bands respectively, and these positions be represented by the corners of an equilateral triangle (Clerk Maxwell's triangle), it has been mathematically determined in what position within this triangle the colours of Newton's rings would fall. Lord Rayleigh, by means of a diagram and the selenite wedge, showed that the relations to the three standard colours in practice were identical with the position assigned them by theory. In conclusion, the lecturer showed a piece of glass, the surface of which had been decomposed, a ray of light transmitted through which showed upon the screen patches of very pure colour. These he considered to be due to the glass consisting of a number of thin plates, some of which had been removed by the decomposition.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the Association on Wednesday, March 23, the President, Mr. H. H. Millhouse, in the chair, Mr. W. Baxter, jun., read some "Notes on a Tour in Scotland," illustrated by lantern slides, which gave a very interesting account of a tour in Scotland, finishing up with a detailed account of Ben Nevis. In the course of the paper the author gave his personal experience as to the results of experiments with coca and its preparations during several mountain-climbing expeditions. The following are the passages in which this subject was referred to :—

Experiments with Coca.

BY W. BAXTER, JUN.

"The mountains climbed were the following : Ben Nevis, 4406 feet; Ben Lawers, 3986; Ben Cruachan, 3650 (approximately) ; Ben Lomond, 3192 ; Ben Ledi, 2875 ; Ben Vrackie, 2757. The preparations of coca that I took with me were (1) the leaves; (2) the liquid extract (made from green leaves), Christy ; (3) Solid extract (made in Bolivia); (4) A pill containing 2·5 gr. of Bolivian green extract in each ; (5) Solution of the hydrochlorate, 1 gr. in ℥ss.; (6) A lozenge containing $\frac{1}{16}$ gr. of cocaine hydrochlorate.

"The accounts travellers have given from time to time of the wonderful effects of coca, have only been treated as a myth up to a year or two ago. The so-called hunger and thirst appeasing effects, as well as the relief of oppressive respiration during mountain ascents : all these were thought as unworthy and superstitious. When, however, the alkaloid was isolated, and its valuable anæsthetic properties were made known, then we began to think there was something in these travellers' tales concerning the South American Indians, and now we are constantly having fresh evidence of its value. Personally, I now believe in its extraordinary power in staving off hunger, etc. The leaf is the best; next to that comes the liquid extract, which, if good, does almost as well ; but an equivalent of cocaine fails, so it would appear that there is some active volatile component which is interfered with in isolating the alkaloid. What this is, and how to isolate and preserve it, is something for us to work upon as pharmacists.

"Ben Cruachan is one of the grandest and most conspicuous of Scotch mountains. It is really the toughest piece of work in the British Isles with the exception of Scuir-ne-Gillear in Skye. The first part is very steep, but good footing ; the latter part is a stony wilderness, over which no two successive steps admit of the same muscular tension. On starting I took a coca pill, but my respiration after three-quarters of an hour's work or so became burdensome, and I began to feel fagged out by the steep climb through a wood which commences the ascent. I sat down by the side of the mountain torrent and patiently chewed about 60 grs. of coca, adding a little sodæ carb. I then made another start following the course of the Cruachan Burn until the corrie under the summit was reached. From here begins the sharpest of ascents over the roughest of boulders; a stick is here a nuisance as you constantly have to go in for hand and knee work. I thought here is a good test for the coca, for I am sure I should have been exhausted more than once under ordinary circumstances, but I felt no fatigue, my respirations were easy and no sense of hunger or thirst was experienced. Perspiration, however, was not diminished in the slightest, as after this toilsome bit my flannels were saturated. I have not time to describe the view to you; the thing that pleased me most was the grand peak of Schiehallion, like a huge sugar-cone, to the north, and to the south the curious contour of Ben Arthur the Cobbler. Now whether it be due to the delightful change from the hard "collar" work of the ascent, or to the vast horizon commanding the eye "skinned," to use an expressive Americanism, by the exercise in the "caller" air, or to the sense of momentary superiority to all my neighbours, or to the absolute freedom from all sublunary cares, or to the exhilarating influence of the rarefied air charged with ozone, or to the coca, or finally, as is most likely, due to the whole of these causes combined, I will not attempt to decide, but certain it is that I felt most happy and calm in mind, sitting on a mountain-top in clear weather with the world at my feet, and on this occasion I felt very loth to descend. I started to walk along the ridge which dips 300 feet to the other peak, and here I found nonconformity still the creed of the earth's crust; the arrangement of the huge granitic boulders can only be described as chaotic. The view from the east peak was very fine. Thence I descended along the ridge to eastwards to Loch Awe Hotel again. Having dined I had a headache for about one and a half hours. It is a rarity for me to have a headache at all, and as I felt no fatigue I could not willingly put it down to the day's exertions. It was a very mild attack, but I subsequently noticed that this always took place after the first full meal after taking coca, but when it went it left my intellect wonderfully clear and active. I should be glad to know whether any present have felt this on experimenting. Another thing I noticed was it made me rather costive.

"In a quick ascent up Ben Lomond, I took ℥iij. liq. extract on leaving the steamer and got to the top in fifty minutes, the view from which is very superior, being a border height, Lochs Ard and Lomond being the two striking features. Again there was no feeling of fatigue. I descended in fifty minutes. The ascent of Ben Lawers was made from Lawers on Loch Tay. I took ℥ij. of solution of cocaine. I took about two and a half hours going up, as I did a good deal of botanizing on my way across a huge moorland where there were hundreds

of sheep, cattle and ponies grazing. The last twenty minutes' work is stiffish, and I knew the cocaine had failed as my breath troubled me here and I was tired on reaching the summit.

"Ben Ledi is an easy climb, so I took no coca, the view is very remunerative, as it is another of the border heights.

"Ben Vrackie is ascended from Pitlochry, on the east side of Scotland. It is quite a ladies' excursion, but I determined to descend to Blair Athole and walk back to Pitlochry through the Killicrankie Pass, visiting the falls of the Tummel on my way; this made about a twenty-one-mile walk of it. After a fair breakfast I started and consumed in the first two hours 90 gr. of coca leaves. View from the top is very lovely. I arrived back at four o'clock, having walked from the Tummel to Pitlochry, a distance of three miles in thirty-five minutes in a pelting rain, the first wet I had had. I was not at all fatigued nor distressed for food, but I had my headache shortly after partaking of a good dinner."

The author also mentioned several cases in which he had administered solution of cocaine or cocaine lozenges to persons suffering from sea-sickness, with beneficial effect, and he quite confirmed the experience of Mr. Sumner as to the value of the alkaloid as a remedy (see *Pharm. Journ.*, [3], xvi., 712).

In consequence of the lateness of the hour the author had to postpone until the next meeting reference to a number of botanical, geological and other specimens collected during the trip.

A meeting of the Association was held on Wednesday, March 30, when Mr. T. S. Dymond, Vice-President, took the chair. The first paper read was a—

Note on Vinum Ipecacuanhæ.

BY F. C. J. BIRD.

In the discussion which followed the reading of Mr. J. C. Shenstone's paper on Vinum Ipecacuanhæ at the 1886 meeting of the British Pharmaceutical Conference, Mr. Conroy stated that he considered it was a great mistake to order the powdered root in the B.P. formula, and that a much better result was to be obtained by the substitution for it of the whole root.

Seeing that the chief objection which has been urged against the use of the powdered root has been its tendency to block in the percolator, if the whole and powdered roots can be exhausted by an acetic menstruum with equal facility, the advantage evidently lies on the side of the employment of the uncrushed root, not only on account of the saving of labour, but also by reason of the percolation being under perfect control. To test the two processes, therefore, the following experiments were made.

One pound of a selected sample of good dry ipecacuanha root was taken, mixed thoroughly, and divided into two equal portions. One of those (C.) was very lightly broken up, so as to obtain small pieces which would pack together well in a percolator. The other (F.), was carefully powdered and passed through a No. 20 sieve, care being taken to produce as little powder as possible of a higher degree of fineness. Eight fluid ounces of B.P. acetic acid having been poured on each sample, both were allowed to macerate for twenty-four hours. and were then packed to the same height in two similar percolators, covered with water, and allowed to undergo further maceration. Percolation was then proceeded with, all subsequent operations being conducted simultaneously, so as to make the results obtained as comparative as possible. The percolate was collected in thirty-two fractions of 5 fluid ounces each, and as to a certain extent the colour of the percolate may be assumed to correspond to its alkaloidal content the comparative colour value of the fractions was estimated in order to show at what rate and to what extent exhaustion was taking place. Taking as a standard the fraction F. 7, which was of a medium and easily imitable

Percolate. No. of fraction.	Colour value.		Reaction with Meyer's reagent.	
	C.	F.	C.	F.
1	170	240	—	—
2	240	226	—	—
3	130	144	—	—
4	90	110	—	—
5	48	48	Copious precipitate	Copious precipitate.
6	22	17	,,	,,
		Standard		
7	12	10	,,	,,
8	8·33	5	Quite opaque	Strong opalescence.
9	6·66	3·8	,,	,,
10	5·26	3·2	,,	Moderate opalescence
11	4·54	2·8	,,	,,
12	3·94	2·5	Strong opalescence	,,
13	3·44	2·3	,,	Moderately faint opalescence.
14	2·68	2·0	Moderate opalescence	Faint opalescence.
15	2·5	1·8	,,	Very faint opalescence
16	2·38	1·55	,,	,,
17	2·27	1·3	Moderately faint opalescence	,,
18	2·05	—	,,	,,
19	1·73	—	,,	,,
20	1·61	—	Faint opalescence	,,
21	—	—	,,	,,
22	—	—	Very faint opalescence	,,
23	—	—	,,	,,
24	—	—	,,	,,
25	—	—	,,	,,
26	—	—	,,	,,
27	—	—	,,	,,
28	—	—	,,	,,
29	—	—	,,	,,
30		—	,,	,,
31	—	—	,,	,,
32		—	,,	— ,,

colour, 10 c.c. of that fraction were placed in a tube standing on a white surface, and distilled water was added to 10 c.c. of the fraction to be compared, until the same quantity placed in a similar tube gave a colour equal to that of the standard. The number of c.c. required to effect this being noted, the comparative colour strength was calculated in terms of F. 7, taken as 10. Weaker percolates were compared by dilution of 10 c.c. of the standard to their colour.

Mayer's reagent produces a copious precipitate in vinum ipecacuanhæ, notwithstanding the alcohol which it contains. As soon, therefore, as a percolate gave only a faint, barely visible opalescence with a drop of the test the root was assumed at that stage to be practically exhausted.

When the acetic acid was poured on the two samples of root, in the case of the coarse powder it was at once absorbed and a damp mass produced; but the broken root required twenty-four hours and frequent stirring before the whole of the acid was taken up. The first percolate from the broken root was much lighter in colour than that from the powdered root, this being due to the fact that the water displaced the strong liquid from the coarsely powdered sample, but when poured on the other, no displacement took place, the strong liquor merely diffusing from the root into the water and so becoming diluted. The exhaustion of the powdered root seems to finish much more abruptly than that of the broken root, the gradual decrease in the colour of the percolates from the other being very marked. After C. 20, and F. 17, the colour became so faint that it was not possible to imitate it with any degree of accuracy.

Fractions F. 32, and C. 32, gave a very faint opalescence with Mayer's reagent, and slightly reddened litmus solution. In testing the fractions, equal volumes were measured in a graduated pipette, and equal quantities of Mayer's reagent added to each.

From the above results it would seem that by careful percolation ipecacuanha in coarse powder may be practically exhausted with less than half (40·6 per cent.) of the menstruum ordered in the B.P., and as the employment of the root when even lightly bruised increases the quantity of liquid required to nearly half as much again (59·3 per cent. of the B.P. quantity), it is a question whether the gain in convenience would compensate for the damage done to the emetine by the increased time of evaporation and consequent exposure to heat. In order to ensure the easy percolation of ipecacuanha root of the B.P. degree of fineness, the operation of powdering it must be very carefully conducted. In the ordinary course of powdering the root, unless special care be taken, the powder which has passed through, say a 20 sieve, will be found to contain a considerable proportion which will pass through a 60, or even an 80 sieve, and unless this dust be excluded percolation is almost certain to come to a standstill. If, however, the ipecacuanha be not too dry, and very lightly powdered and frequently sifted at first until the cortical portion has disappeared, no difficulty will be found in producing a powder from which a 30 sieve will remove very little, and which so far as my experience goes may be percolated with ease.

A certain quantity from each of the C. percolates was accurately measured and the whole mixed together, the F. percolates being treated in the same manner. Of the resulting liquids that from the F. percolates was considerably the darker of the two.

In conclusion, I think the editors of the British Pharmacopœia were correct in directing, in the formula for vinum ipecacuanhæ, that the root be coarsely powdered; but the quantity of liquor to be collected seems very large, and might with advantage be considerably reduced.

In a discussion upon this paper Mr. E. Taylor said that he had never found percolation retarded by the root being finely divided, but suggested that if such were the case, sand or pumice-stone might be employed with advantage.

The Chairman, referring to Mr. Bird's statement that the amount of menstruum ordered by the British Pharmacopœia was in excess of the quantity required, said he thought that although so large a quantity might not be needed in a carefully conducted laboratory experiment, yet when made on a larger scale the larger quantity of menstruum would be an advantage in obtaining a more average product.

Mr. Bird, in reply, suggested the use of some simple test to ascertain when the extraction had been sufficiently complete, so that a careful manipulator would have an advantage over a more unskilful one.

Mr. Bird then read a "Note on a Modified Form of Filter Tube for Use in the Estimation of Alkaloids by Mayer's Reagent." The paper will be printed in a future number.

The next paper read was a—

Note on Water Softeners.

BY J. T. MILLARD.

The method for softening water that has been most extensively employed is that proposed by Professor Clark, and consists in the addition of lime to the water in sufficient amount to neutralize the free dissolved carbonic anhydride. The result of this is to cause a precipitate of calcic carbonate, previously retained in solution by the excess of carbonic anhydride, with the added lime.

A minute amount of calcic carbonate still remains in solution, the salt not being absolutely insoluble. But the most important point to notice is that the temporary hardness alone is practically affected, the permanent hardness remaining almost exactly as it was before.

Within the last few years, several powders under fanciful names have been introduced for the purpose of softening water. The number, however, is very small, and they all make use of Clark's suggestion, and consist either entirely or partly of slaked lime. One of these, which is protected by a patent, is composed of lime, alum and carbonate of sodium, and gives excellent results with some samples of water.

The use of sodic carbonate as a water softener is by no means new, having been often employed either with or subsequent to, the action of lime, to reduce the permanent hardness. Borax and baric carbonate have been used for a similar purpose, to the latter, however, there is the fatal objection of its injurious nature if taken internally. It was with the idea of ascertaining the relative utility of these agents as water softeners that the following comparative experiments were made.

Equal weights of slaked lime, dried carbonate of sodium, borax and a mixture of equal parts of soda and lime were each tried on the same amount of water, of which the total and permanent hardness had previously been ascertained.

The usual directions of the proprietary powders are that as much of the powder as will cover a shilling be placed in the ewer over night, the water stirred well, and poured off from the sediment in the morning. This amount was found to be about equal to 2 grains to the pint, so 2 grains (0·1295 gram) of each of the above were mixed with one pint of the water, the whole stirred well, allowed to stand over night, and the hardness estimated in the usual way the next morning. The hardness is given in degrees of Clark's scale, each degree being equal to 1 grain of $CaCO_3$ per gallon.

	Water alone.	Ca2OH	Na_2CO_3	$Na_2B_4O_7$	Equal parts Ca2OH and Na_2CO_3.
Total hardness	11·5°	4·02°	4·3°	8·4°	3·5°
Permanent ,,	4·2°	3·85°	1·92°	2·1°	1·75

It is evident from the above table that the mixture of equal parts of dried carbonate of sodium and lime gives extremely good results, and it is noteworthy that in each case the supernatant liquid yielded no trace of alkaline reaction either with litmus or phenol-phthalein. The chief objection to preparations of this kind is that the amount and proportions of the mixture required must vary according to the hardness of the water. Thus the same amount of the mixture tried on a water that had a total hardness of 44°, only reduced this to 31° and the water would still remain excessively hard. Nor will the simple plan of adding a larger quantity of the powder answer, as the result gave an alkaline liquid that was still hard, but upon increasing the proportion of lime and reducing the soda a soft and neutral water resulted.

This only points to what should be the practical outcome of this paper, namely, that these water softeners should be prepared by chemists themselves, who could easily estimate the hardness of the water in their neighbourhood, and so proportionate the amount of ingredients with the hardness. For this purpose the above table may be useful, or calculation may be made directly, using 1 grain of Ca2OH per gallon for every degree of temporary, and 2 grains of Na_2CO_3 per gallon for every degree of permanent hardness.

I might add that the powder should be as fine as possible, and should be put up and kept in a tin having a well-fitting lid, or the lime is soon converted into carbonate.

In the discussion that followed the reading of this paper, Mr. Baxter corroborated the statements made by the author, and expressed surprise at these preparations not being more universally employed, as he considered that the peculiar greasy suds formed with a hard water, such as that supplied by the Kent Water Company, must be detrimental to health by stopping the pores of the skin. At the same time he thought it was the business of the water companies to soften the water, as the work would not then be left in the hands of ignorant persons.

The Chairman said that some companies did treat the water with this object, but he pointed out the undesirability of freeing water from all its mineral impurities, and stated that with soft waters, such as that supplied to Glasgow or Manchester, it was almost necessary to add lime in order to harden them.

Messrs. Bird, Botham, and Worsley also joined in the discussion, and it was agreed that the preparation of these "water softeners," suitable for the water of the vicinity, was a desirable extension of a chemist's business.

The rest of the evening was taken up by the concluding remarks by Mr. Baxter, jun., on his tour through Scotland, in which he referred to a number of herbarium specimens, amongst which were a fine collection of gentians. He also exhibited a number of geological specimens, principally from Ben Nevis and Ben Lawers, commenting upon the extraordinary strata of porphyry occurring upon the top of Ben Nevis.

In the discussion which followed, Mr. Dymond asked what means Mr. Baxter had employed for mounting his botanical specimens.

Mr. MacEwan stated that he had found equal parts of tragacanth and acacia gums, 1 oz. of each in 1 pint of water, to which a little mercuric chloride and oil of cloves were added, to be best for this purpose, and also suggested that if chemists would make public any meteorological observations they might take, it would be an attraction to their business.

Messrs. Bird and Worsley also took part in the discussion.

Mr Baxter, in reply, stated that he used a thin mucilage of rice starch, to which a little carbolic acid had been added, for the mounting of botanical specimens, and otherwise than mounting quickly took no special steps to preserve the colours of the flowers.

Provincial Transactions.

MANCHESTER PHARMACY STUDENTS' ASSOCIATION.

The third annual meeting of the above Association was held in the Pharmaceutical Laboratory, Owens College, on Thursday evening, March 24th inst. (Mr. William Elborne in the chair), to receive the Treasurer's and Secretary's reports for the session 1886-87, and to elect officers for the ensuing one.

The Annual Report of the Committee stated that the number of members was thirty-six, and the attendance throughout the session had been good. The financial position of the Association was also satisfactory. The Committee again desired to acknowledge its indebtedness to the Council of the Owens College for granting the Association the free use of the Pharmaceutical Laboratory and Materia Medica Museum for the purpose of holding meetings. On October 28, an introductory address had been given by the President, Mr. William Elborne, and at that and subsequent meetings, various papers and communications had been read.

The report having been received and adopted, the officers were elected for the session 1887-8, as follows :—President, William Elborne ; Vice-Presidents, W. Lane, W. Spencer Turner ; Hon. Treasurer, W. Gibbons ; Hon. Secretary, H. Wilson ; Committee : J. Clayton, E. D. Mitchell, A. Wilkinson, A. B. Rhodes, J. Redhead ; Reporters : Pharmacy, J. C. Husband, F.C.S. ; Botany, W. S. Turner ; Materia Medica, W. Elborne ; Chemistry and Physics. A. W. Duncan, F.C.S.

The Hon. Secretary, E. D. Mitchell, upon retiring from re-election, received a hearty vote of thanks for the services he had rendered to the Association for the past two years.

TORQUAY CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting was held on the 23rd inst., Mr. W. Smith in the chair.

Mr. Milne gave an interesting and instructive lecture on "The Mouth and Digestive Organs," which referred to the functions of the different teeth glands, etc., and traced the processes to which food is subjected before assimilation by the system.

After some discussion, a vote of thanks was accorded to the lecturer.

Parliamentary and Law Proceedings.

The Sale of Laudanum.

An inquiry was held March 29, at the Leeds Town Hall, by Mr. J. C. Malcolm, the Borough Coroner, respecting the death of Samuel Smith, sixty-one, joiner, of 37, St. Mark Street, Woodhouse. On Saturday evening Smith came home drunk, and was subsequently found lying on his bed with an empty bottle by his side, which was found to have contained laudanum. Assistance was procured and he was taken to the Infirmary in an unconscious state, where he died on Sunday morning. He had been in the habit of taking laudanum when drunk, and about eight o'clock on Saturday evening he went into the shop of Mr. A. P. Dyson, wholesale chemist, 178, Woodhouse Lane,* and asked for sixpennyworth of that article. Not knowing who he was, Mr. Dyson asked him what he wanted it for, and he said he had got toothache, and not suspecting anything, Mr. Dyson allowed him to have the laudanum. A written white label was put on the bottle, Mr. Dyson not having any of the proper red ones in stock. The medical evidence showed that death had been caused by syncope.

* There is no entry corresponding to this name and address on the Register of Chemists and Druggists.

The dose he was supposed to have taken was said to have been quite sufficient to destroy life.

The Jury returned a verdict to the effect that the deceased had committed "suicide by taking an overdose of laudanum." They also wished to censure the druggist for not having a proper label and for not being more careful as to whom he sold laudanum.

Obituary.

Notice has been received of the death of the following :—

On the 18th of March, Mr. Septimus Frederick Leete, Chemist and Druggist, Thrapston, Northamptonshire. Aged 72 years.

On the 18th of March, Mr. Thomas Townson, Chemist and Druggist, Bridgwater. Aged 76 years.

Review.

THOMSON'S CONSPECTUS, ADAPTED TO THE BRITISH PHARMACOPŒIA OF 1885. Edited by NESTOR TIRARD, M.D., L.R.C.P., etc. New edition.*

Nearly eighty years have now elapsed since the late Dr. Anthony Todd Thomson published the 'Conspectus of the Pharmacopœias of London, Edinburgh, and Dublin,' of which the book under notice is put forward as the lineal descendant and representative. Certainly it is very suggestive of the value of the traditional reputation of a successful book that it should be still worth while to prefix Dr. Thomson's name to a work that has at the hands of successive editors undergone such fundamental alterations in every respect except plan. In the preface to this new edition the present editor states that he "has endeavoured to bring the book into accordance with the British Pharmacopœia of 1885 and has made such other corrections and alterations as were found necessary from the progress of science." Probably in the therapeutical portion the editor's special qualifications have enabled him to attain this end, and as the work is essentially one for medical students this is of primary importance; but turning to the parts that can be more appropriately criticized in these pages blemishes may be found that are rather significant as to the superficial way in which chemistry and pharmacy are taught in the medical schools. For instance, on p. xi. the reader is still told that "the salts most commonly adulterated are potassii carbonas and sodii carbonas!" Four pages further on he is told in reference to the halogen compounds that when the compound consists of one equivalent of each compound the prefix *prot*, *proto*, or *sub* is used without any suggestion that this applies only to a limited class, and not to such salts as sodium chloride; after which he is further informed that "when it contains two equivalents of the base [*sic*] the syllable *bin*, *bi*, or *per* is added." Take as another example of "how not to do it," the information vouchsafed as to the process for the preparation of potassium iodide. "Liquoris potassæ cong. j.; iodi unc. xxj. vel q. s.; carbonis ligni unc. iij; aquæ destillatæ ferventis q. s. The iodate of potassium is first formed and converted into the iodide of potassium." Sodium iodide is said to be prepared similarly. Now it is difficult to conceive what useful purpose will have been served when a student has assimilated this information, which might excuse him for supposing that the two operations were comparable to the making of infusions. Some of the pharmaceutical operations are hardly more fortunate. For instance, in respect to the standardized preparations that have now been made official information is given as to the percentage of alkaloid they should contain, but the directions as to their manufacture include no suggestion as to the manner in which the agreement of the product with the standard is to be ensured. Again under "Syrupus Ferri Iodidi," in the directions for its preparation the instruction to boil a portion of the syrup with the solution of the iodide is omitted. In other places the official work has been followed with a loyalty that might have been spared, as where cocaine hydrochlorate is said to be "soluble in water, alcohol and ether." But enough has been said to indicate that there is still room for further revision in a future edition.

The official section is followed by several appendices, including notices of the more important non-official medicines and preparations, a short treatise on poisons, examples of prescriptions, etc.

* London: Longmans, Green and Co. 1887. Small 12mo. Pp. i.–xxiv., 1–251. 6*s*.

BOOKS RECEIVED.

THE MEDICAL ANNUAL AND PRACTITIONER'S INDEX. Edited by PERCY WILDE, M.D. 1887. Bristol: J. Wright and Co.

THE ORGANIC MATERIA MEDICA OF THE BRITISH PHARMACOPŒIA. By WILLIAM SOUTHALL. Fourth Edition. London: J. and A. Churchill. 1887.

GRIFFITHS' MATERIA MEDICA AND PHARMACY. Third Edition. Edited and in Part Written by ALFRED S. GUBB, L.R.C.P., M.R.C.S., etc. London: Baillière, Tindall and Cox. 1887.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE FUTURE OF PHARMACY.

Sir,—If I may be allowed I should like to comment upon a letter signed "Pro Bono Professionis."

As the writer is evidently unacquainted with the exigencies of the trade (we can hardly in these cases call it a profession) as it exists in most small country towns, perhaps he will permit me to point out to him that in such places the art of dispensing a prescription is only of occasional use, and that frequently the profit derivable from this source will not suffice to pay the gas bill. Again prescribing is sure to bring down severe condemnation from all the medical fraternity in the neighbourhood, inevitably followed by loss of prestige. Further, the sale of drugs and chemicals is necessarily limited, besides which most of the principal inhabitants are either members of a co-operative store, or have access to their price lists, which results in obliging the dealer to trade on small profits; therefore it is found that in order to make a living a wider field must be cultivated.

The manufacture of horse balls, mixing of paints, and handling of oils forms an integral part of the education of a country apprentice; not perhaps so much that he shall in after life do these things personally, as that he may be able intelligently to direct the raw lad who officiates as porter, and who with the apprentice performs these duties.

The idea of having one's teeth extracted by an individual reeking with paint, and soiling everything with which he comes into contact, is comical, but it suggests to one's mind a man so deficient in manipulative skill that no thinking person would ever trust him to perform a surgical operation. It may interest "Pro Bono Professionis" to know that I have personally handled many tons of paint, in quantities of from half a pound to over a hundredweight, without any protection and without damage; that I have known others do similar work equally cleanly, and that I should consider any person who after a few weeks' practice cannot do likewise would be too careless to be entrusted with pharmaceutical work at all.

As to its being our duty to wish our brother pharmacist success with his branch shops, I beg most emphatically to assert the exact contrary, this practice seems to me most injurious to the trade at large, because it directly tends to keep the majority of assistants indefinitely in a subservient position, and to do away with the constant personal supervision necessary in all professions.

I am quite at one with "Pro Bono Professionis" as to the desirability of raising the profession of pharmacy above this sort of mixed trading; but I must remind him that when it is a question of slow starvation with professional status against a comfortable living on a slightly lower basis (and bear in mind that the general public do not appreciate the sacrifice, but rather exalt the man who makes the most money), no one possessing any common sense will hesitate to adopt the course which is most to his general social and pecuniary advantage and to the comfort and well-being of his family.

London. AN EX-COUNTRY CHEMIST.

SIR JOHN LUBBOCK'S BILL.

Sir,—Your space is too valuable for me to waste a column in wordy explanations, so I will be very brief. If I erred in saying that Mr. Hart "undertook" to introduce the subject to the meeting, I apologize, though it was certainly impossible to infer anything else from the circular convening the meeting.

Even admitting that the duty was "put upon him," one would naturally think that such a burning question would have had more attraction for him than such a quiet affair as a committee meeting of local microscopists.

The "excessive innate bashfulness" attributed to me will not prevent me stating that Mr. Hart's remarks regarding "the chiefest among ten thousand" are simply his "chaff." They might otherwise be taken seriously.

254, *Stretford Road, Manchester.* H. KEMP.

SOUTH AUSTRALIA.

Sir,—Your correspondent, "R. G.," may be interested in the following extract from a letter written from Melbourne last July from a former apprentice of mine. To begin:—"City businesses of the first class are, as you may suppose, seldom in the market, but every month there are several suburban ones for disposal. I enclose a list taken from a price list for June. That there are fortunes to be made in this line is an undeniable fact: but circumstances alter cases. The usual way is to begin in a small way in a new place; work up the business to £200 or £300 a year, then exchange or sell out and get a better. All that is necessary at the start is a little money and unlimited cheek. Of course, for a single or not much-married man, many things are easy and possible that could not be attained by a man with a large family without waste of time and perhaps loss of capital. As I said before, money is needed, and if one has that and can afford to wait about town for some time he can make a good selection. Some country businesses are good, especially if the proprietor is well up in prescribing; the only thing against that is the absence of agreeable society. The fact of the matter is, that money is worshipped here as well as elsewhere, and the upper ten living in Toorak and South Yarra will not mix with trade, although they, only a few years since, were driving sheep, or bolting with them, as their fathers did before them. They, however, are now 'squatters.' When they get into Parliament these things are sometimes raked up and then they see themselves as others see them; bushmen have thick skins. New Zealand and Tasmania are sleepy and behind the times, especially the latter. South Australia is experiencing the result of a financial depression following drought and bad seasons. New South Wales is at present dull and lacking in energy; perhaps being a little too conservative. She has, however, natural advantages of a superior kind—the climate is against it, being too relaxing. Queensland is fit for salamanders and niggers. Victoria at present is the most flourishing. Western Australia is, I believe, the coming colony, and if I could manage I should go there. Buildings are running up very fast at Perth, Freemantle and Albany; outside the immediate neighbourhood of the towns very little is known at present, but reports come in from time to time of a most favourable description. The lack of water in the Kimberley district seems to be the only drawback, as there is grass six or seven feet high and plenty of gold, and the land seems particularly fertile along the course of the rivers. Of course there is a deep-felt affection for 'home' and things pertaining thereto, but I believe marriage to be the panacea for many of both sexes, causing them to feel to be more settled.

Cromer. EDWD. RAVEN PRIEST.

LIME WATER.

Sir,—In the discussion on Mr. Fraser's paper as reported last week, I am made to say that there was no difficulty in having lime water of "full B.P. strength," and also that we found our own "sometimes above and sometimes below the official standard," this indicating, if my remarks are correctly condensed, a confession of great carelessness on my part in the preparation of lime water. What I intended to say, and what I think I did say, was that for some time past I had required the assistants to make weekly or fortnightly estimations of the lime water, and while it was usually above half a grain per ounce, it was sometimes a shade below that standard. For example on a recent occasion the quantity estimated was neutralized by 88 gr. measures in place of 90, but as the B.P. gives "about" 5 grs per oz., I think I am quite safe in saying that this is B.P. lime water.

I would further add that the condition of affairs represented by some of Mr. Fraser's samples is simply a disgrace to pharmacy.

Hawick. THOS. MABEN.

DISPENSING OF TEREBENE AND TOLU.

Sir,—On reading the correspondence on the above subject I was curious to know if it were really possible to make an emulsion of terebene with mucilage of tragacanth as Mr. Bisset describes in his note. Proceeding after his method I obtained an emulsion, which after standing forty-eight hours did not show any globules, but separated into two layers, the upper to all appearance being made up of the insoluble portion of the gum with the terebene thoroughly incorporated. The two layers were easily assimilated by a slight shake, forming an emulsion certainly equal if not superior to the one made with gum arabic. The only conditions essential to success are, I think, perseverance with careful manipulation.

Regarding the mixture containing terebene and tolu, I find it is quite unnecessary to emulsify them separately as Mr. Sewell suggests. It may be done more quickly and with less trouble by rubbing them together in a mortar with the mucilage, or, better still, pour the mucilage into the bottle, add the tolu and terebene, shake thoroughly, then add the other ingredients. A beautiful emulsion is formed either way. The tolu appears to accelerate the process, probably owing to the fact of its being more easily assimilated. After emulsification it seems to act as an emulsifying agent.

63, *Inverleith Row, Edinburgh.* GEO. ROBERTSON.

Provincial (*Dungarvon*).—We think the publication of the letter is hardly desirable without such support as would be afforded by the name and address of the writer.

Oxonian.—There was probably nothing remarkable in the glycerine, except that it might have been a little purer than usual. If the containing vessel had been placed in hot water the necessity for the use of a chisel would have been dispensed with. See a paper in the *Pharmaceutical Journal*, [3], vi., p. 1030.

Nux Vomica.—Tinct. Rhei aquosa, P.G.—Rad. rhei, 100; boracis, 10; kalii carb., 10; aquæ, 900; aq. cinnam., 150; spiritus (sp. ·834), 90. Radicem Rhei non nimis subtiliter concisam et cribrando pulvere liberatam, Boracem, Kalium carbonicum, Aqua ebulliente superfusa, in vase clauso per horae quadrantem ad extrahendum sepone, tum Spiritum admisce. Jam una hora circumacta, panno laneo cola, portionem non solutam leniter exprimens. Denique *partibus octingenis quinquagenis* colaturae *centenas quinquagenas* Aquae Cinnamomi admisce.

J. T. Coats.—We quite agree with you that it is desirable there should be such a library, but you fail to suggest from what fund the books are to be provided.

Felix.—The question is a medical one and should be addressed to a medical authority.

S. F.—Cornus mas.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Elborne, Flückiger, Alcock, Grierson, Furness, Remington, Sec. Brit. and Col. Agency, Ph. Chemist, Junior Apprentice.

NOTICE TO THE WHOLESALE AND RETAIL TRADE.

On the 1st of May next,

Mrs. Johnson's American Soothing Syrup

Will be issued in two sizes instead of one, as heretofore. The bottle hitherto sold at 2s. 9d. will retail at 1s. 1½d., and a larger 2s. 9d. size will be introduced. Any stock in good condition unsold on the above date will be exchanged for new.

Handsome Show Cards are in course of preparation, and any Chemist who will favour us by displaying one can have it sent to any London Wholesale House for enclosure.

Sole Proprietors of Mrs. JOHNSON'S AMERICAN SOOTHING SYRUP,

BARCLAY & SONS, 95, Farringdon Street.

BARCLAY & SONS

Have pleasure in announcing that in response to the wishes of numerous customers they have opened a

SHOW ROOM,

where samples of Sundries and all goods quoted in Part II. of their Catalogue may be inspected.

BARCLAY & SONS, 95, Farringdon Street, London.

Woodhall Spa.

BROMO IODINE MINERAL WATER.

The strongest known Mineral Water in the world. This remarkable Spa has been purchased by a syndicate of gentlemen, who have determined to make more widely known the extraordinary curative powers of this Spring, which contains more Iodine and Bromine than any Spring in Europe. An analysis of the water having been made in November, 1886, by Professor Wanklyn, M.R.C.S., corresponding member of the Royal Bavarian Academy of Sciences, Professor of Chemistry, a very important discovery has been made—viz., the presence of Free or Elementary Iodine.

Dr. WANKLYN says:—"So far as I am aware, this is the first instance in which free iodine has been found in appreciable quantity in a natural water. For many years the Woodhall Spa has been celebrated as a valuable remedy in skin diseases. The fact that it is a solution of free iodine is interesting in this connection, and well worthy of the attention of the medical profession."

The Woodhall Bromo Iodine Water is now being bottled at the Spring by the Sole Agents, BROMLEY & CO., Chemists, 233, High Street, Lincoln, 5 and 6, The Grove, Buxton, and Woodhall. All communications to be addressed to them at the Spa, Woodhall, Horncastle.

A daily luxury for rich and poor.

VAN HOUTEN'S COCOA

Guaranteed pure and soluble,

Is SIMPLY UNEQUALLED and really THE CHEAPEST in the end.

A cup of **this** cocoa costs no more than a cup of tea, and is **a highly nutritive** beverage.
Digested with marvellous facility by the most delicate invalids and children.
Made instantly with boiling water.

The **British Medical Journal** says:

"'Van Houten's Cocoa' is admirable. In flavour it is perfect, and it is so pure, well prepared and rich in alkaloid that it may with great advantage be largely used in public institutions, as well as in private families."

The Lancet remarks: "……it goes a long way, and is really cheaper to use in the end, etc., etc."

Invaluable in railway stations, hospitals, on board ship, in the camp, for workmen (at home and to take to their *work*), etc., etc.

Try it once and you will use and recommend it always.

Sample tins free through your grocer or chemist.

BURROUGH'S SPIRITUS RECTIFICATUS, P.B.

SPIRITS OF WINE CHEMICALLY PURE

The Best English Grain Spirit, free from Fusel Oil.

ALSO FINEST ORANGE WINE AND SHERRY FOR MEDICINAL PURPOSES.

CALE STREET DISTILLERY, LONDON, S.W.

Duty free for Exportation—also best Methylated Spirit at lowest prices.

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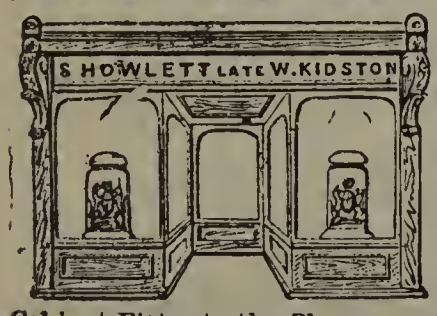
4, LINDLEY STREET (formerly called North Street), SIDNEY STREET, MILE END, LONDON, E.

A few minutes' Ride by Omnibus from the Bank.

Medical & General Shop Fitter.



Shops fitted by S. H., and to whom references are kindly permitted:—

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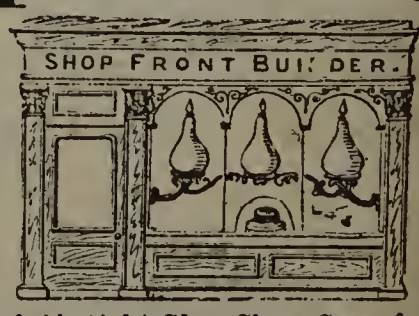
,, N. Nicholson, Canonbury, London.
&c. &c. &c.

Messrs. Leath & Ross, St. Paul's Church Yard, London.
,, Harvey & Reynolds, Leeds.
Mr. W. F. Smith, 280 Walworth Road, S.E.
,, Thomas Hall, Lowestoft.
&c. &c. &c.



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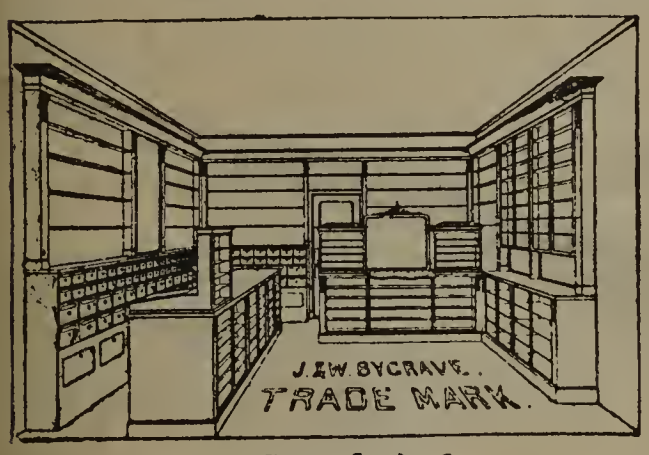

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COMPOUND ANÆSTHETIC ETHER,
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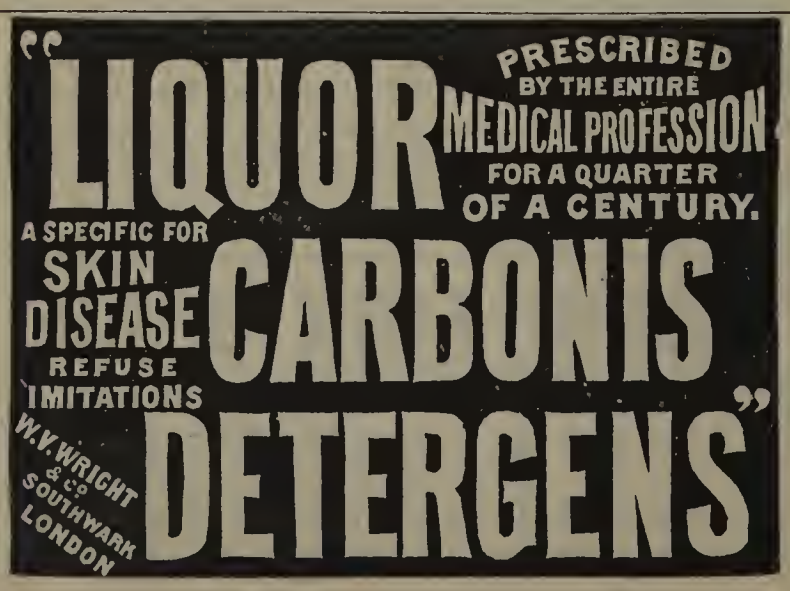

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FLUID MAGNESIA

The Original Preparation of the Inventor,

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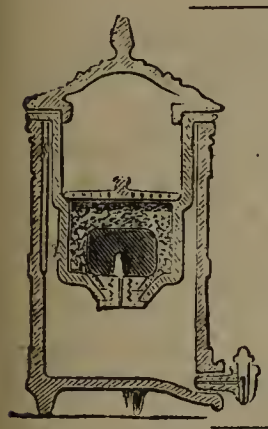

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Will purify very foul water and render it fit for consumption.

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Chemists, Druggists and General Merchants,

LUCKNOW, OUDH,
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BLACK CURRANT LOZENGES.

Plain Black Currant, old square	2s 6d
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Black Currant and Tannin	3 0
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(* Ipecac. and Morph., strength as "B. P.")

In Bottles, 1 lb., 2 lbs., 4 lbs., and 7 lbs. For Exportation, in soldered tins, of any size. From EDWARDS, London; through any Wholesale House; and from the Manufacturers,

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Who will forward Samples by post on application. Also, BROWN COUGH LOZENGES, 2s.; 7 lbs. stamped with name free, and MUSK LOZENGES (Special), 2s. 6d. *N.B.—Medical Lozenges of every kind,* including those of the Pharmacopœia of the Hospital for Diseases of the Throat, London.

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Mr. T. A. ELLWOOD, M.P.S., &c.

The next course of Lectures for the June and July examinations will commence on Monday, April 25th. Fees—to June examination, 6 guineas; to July, 7 guineas. There are still vacancies for Minor students in the Laboratory, the Major Laboratory being full until the April examination.

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A new and enlarged syllabus, containing full particulars of the Major, Minor, and Preliminary Classes, Time Tables, Fees, and Curriculum adopted in each class, is now ready, and will be sent post free on application....

The detailed curricula are excellent guides to the various examinations...and will be of great service to all students....

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A work which enables 100 compound formulæ of the Pharmacopœia, etc., to be learned in a few readings, fixed for ever and repeated with accuracy. Invaluable to Dispensers and Students. Free Two Shillings from the Author, Mr. H. JUDD (Teacher of Memory, etc.), 31, Regent Square, W.C.

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N.B.—Any Gentleman of ordinary ability who enters College at the commencement of the next course and attends to his studies will be fully prepared to present himself for the Minor Examination in July.

FEES. { **To the June Exam., £6 6s.; July, £8 8s.**
12 Months' Course (Minor and Major), £15 15s.

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Messrs. BARNES, STARK, PARKINSON and WOOD.

Only **3** *other Candidates were successful in passing from all other sources.*

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J. CLAYTON	A. E. HINE	G. TEMPLEMAN
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The Pharmaceutical Journal AND Transactions.

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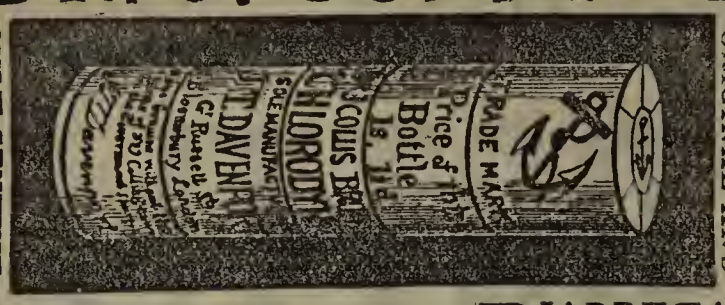

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DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

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IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

FURTHER IMPORTANT NOTICE.

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,, and Iron, B.P.	5 gr.	5 0	16 0
,, and Myrrh, B.P.	3 gr.	5 6	18 0
,, ,, ,,	5 gr.	6 0	20 0
,, Nux Vomica		6 0	20 0
Aloin	1-10 gr.	5 0	16 0
,,	1-4 gr.	6 0	20 0
,,	1-2 gr.	7 0	24 0
,,	1 gr.	11 0	39 6
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,, and Strychnine		7 0	24 0
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Arsenious Acid	1-50 gr.	5 0	16 0
,, ,,	1-20 gr.	5 0	16 0
Asafœtida, U.S.		5 0	16 0
,, Compound, B.P	5 gr.	5 0	16 0
Atropine	1-300 gr.	7 0	24 0
,,	1-100 gr.	7 0	24 0
Blue Mass, B.P.	1 gr.	5 0	16 0
,, ,,	2 gr.	5 0	16 0
,, ,,	3 gr.	5 0	16 0
,, ,,	5 gr.	5 6	18 0
,, ,, Colocynth and Hyoscy		9 0	32 0
Calcium Sulphide	1-10 gr.	6 0	20 0
,, ,,	1-4 gr.	6 0	20 0
,, ,,	1-2 gr.	6 0	20 0
,, ,,	1 gr.	6 0	20 0
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,, Comp. B.P.	5 gr.	5 6	18 0
,, and Opium		7 6	26 0
Camphor and Hyoscyamus		5 6	18 0
,, Mono-Bromated	2 gr.	11 0	39 6
Cannabis Indica Extract	1-4 gr.	7 0	24 0
,, ,, ,,	1-2 gr.	9 0	32 0
Cascara Sagrada Extract	3 gr.	7 0	24 0
Cathartic Compound U.S.P.		5 6	18 0
Codeine	1-2 gr.	20 6	79 0
Colocynth Comp. B.P.	4 gr.	8 0	28 0
,, ,, ,,	5 gr	9 0	32 0
,, ,, and Blue Mass	5 gr.	9 0	32 0
,, ,, and Calomel	5 gr.	9 0	32 0
,, ,, and Hyoscy, B.P.	5 gr.	9 0	32 0
,, ,, Extract, B.P.	5 gr.	9 0	32 0
Conium Compound, B.P.	5 gr.	5 0	16 0
Copaiba Compound		5 6	18 0
,, and Oloe-Resin Cubeb	5 gr.	11 0	39 6
Corrosive Sublimate	1-30 gr.	5 0	16 0
,, ,,	1-20 gr.	5 0	16 0
,, ,,	1-10 gr.	5 0	16 0
Croton Chloral	1 gr.	10 0	36 0
,, ,,	2 gr.	17 0	63 6
Cubeb, Oleo Resin, with Soda		7 0	24 0
Digitalin	1-60 gr.	7 0	24 0
Elaterine	1-20 gr.	13 0	47 6
Emmenagogue (Mutter's)		5 6	18 0
Ergotin	3 gr.	16 6	63 0
Euonymin	2 gr.	16 0	59 0
,,	3 gr.	20 6	79 0
,, Compound		16 0	59 0
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,, ,,	5 gr.	5 0	16 0
,, Comp. (Ipecac. and Opium)	5 gr.	9 0	32 0
,, and Squill, B.P.	5 gr.	5 0	16 0
Iron Arseniate	1-8 gr.	5 6	18 0
,, Carbonate, B.P.	5 gr.	5 6	18 0
,, by Hydrogen (Quevenne's)	1 gr.	5 0	16 0
,, Iodide (Blancard's Formula)	1 gr.	7 0	24 0
,, and Quinine Citrate	2 gr.	10 0	35 6
,, Quinine, and Strychnine		13 6	49 6
Laxative Vegetable (Improved Cath.)		5 6	18 0
Manganese, Bin-oxide	2-gr.	9 0	32 0
Mercury, Bin-Iodide	1-16 gr.	5 0	16 0
,, Proto-Iodide	1-8 gr.	5 0	16 0
,, ,,	1-4 gr.	5 0	16 0
Morphine, Muriate	1-8 gr.	7 0	24 0
,, ,,	1-4 gr.	9 0	32 0
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Pepsin, Pure Concentrated	1 gr.	9 0	32 0
Phosphorus	1-000 gr.	6 0	20 0
,,	1-50 gr.	6 0	20 0
,,	1-30 gr.	6 0	20 0
,, and Iron		8 0	28 0
,, Iron and Quinine		17 0	63 6
,, and Nux Vomica		7 0	24 0
,, Nux Vomica and Iron		8 0	28 0
,, and Quinine		17 0	63 6
,, Quinine, Iron, & Strychnine		17 0	63 6
,, and Valer. Zinc		11 0	39 6
Picrotoxin	1-80 gr.	7 0	24 0
Podophyllin	1-8 gr.	5 0	16 0
,,	1-4 gr.	5 0	16 0
,,	1-2 gr.	5 6	18 0
,, Comp.		8 0	28 0
Quinine, Bi-Sulphate	1-4 gr.	5 0	16 0
,, ,,	1-2 gr.	5 0	16 0
,, ,,	1 gr.	5 0	16 0
,, ,,	2 gr.	7 6	26 0
,, ,,	3 gr.	10 6	38 0
,, ,,	4 gr.	13 0	48 0
,, ,,	5 gr.	16 0	60 0
,, Sulphate	1-4 gr.	5 0	16 0
,, ,,	1-2 gr.	5 0	16 0
,, ,,	1 gr.	5 6	18 0
,, ,,	2 gr.	8 0	28 0
,, ,,	3 gr.	11 0	40 0
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,, ,, and Blue Mass	5 gr.	7 0	24 0
Rhubarb, Ipecac. and Soda		7 0	24 0
Salicylic Acid	2 gr.	7 0	24 0
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,, Comp.		16 6	63 0
Soap Comp., B.P.	5 gr.	8 0	29 0
Squill Comp., B.P.	5 gr.	5 6	18 0
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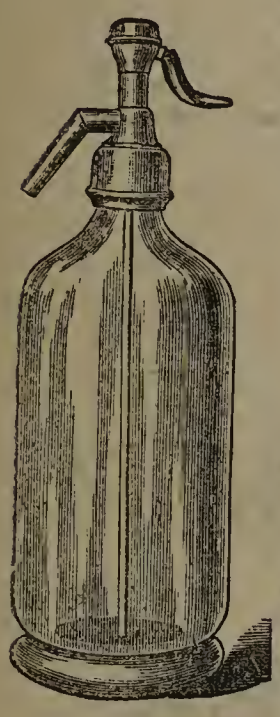

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SPECIAL PRICES ON APPLICATION.

CHEMICAL NOTES ON COFFEE.

BY DR. B. H. PAUL AND A. J. COWNLEY.

1. INFLUENCE OF ROASTING UPON THE AMOUNT OF CAFFEINE.—In our paper on the amount of caffeine in various kinds of coffee,* we referred incidentally to certain statements that have been made as to the influence of roasting, and we expressed the opinion that under ordinary conditions, very little, if any of the caffeine is lost by volatilization in the roasting of coffee. This opinion was, at the time, only based upon the comparison of the amounts of caffeine found in raw and roasted coffee with the rough estimates of the gross loss of weight in roasting that we had been able to obtain as being the result of working operations. We found the amount of caffeine in roasted coffee was generally about 1·3 per cent., while raw coffee contained from 1·1 to 1·18 per cent., or in the dried state almost uniformly 1·2 per cent., the difference being due to the varying amount of moisture present in raw coffee, as it is met with in the market, which was found to range between 6·2 and 10 per cent., the average amount being 8·1 per cent. So far as we were able to ascertain, the actual loss of weight in roasting varies from 15 to 20 per cent. of the raw coffee, and, according to our determination of the caffeine in raw and roasted coffee, there could not therefore be more than a very small portion of the caffeine lost in the roasting operation. But, in order to determine this point more precisely, we have since made a series of experiments with several kinds of coffee, so as to ascertain the exact loss of weight in roasting to different degrees, and also the amount of caffeine in the roasted coffee.

In one experiment the roasting was carried to an extreme degree, and the loss of weight amounted to 31·7 per cent. The roasted product contained only 1·25 per cent. of caffeine, while the amount that it should have contained, according to calculation, if there had not been any volatilization, was 1·61 per cent. In this case, therefore, there was a loss of 0·36 per cent. of caffeine, or just about one-third of the amount present in the raw coffee. The product of the roasting was, however, much more highly torrefied than is usually the case. The berries were very dark brown throughout, and they had lost almost entirely the fine aroma of roasted coffee. In another experiment the roasting was carried just far enough to give the berries a fine chestnut-brown colour, and the loss of weight was only 16 per cent. On determining the amount of caffeine contained in the roasted product the result obtained was 1·36 per cent., or rather more than the quantity indicated by calculation, so that in this case there was no loss of caffeine by volatilization. In a third experiment the roasting was only carried so far that the loss of weight amounted to 13·7 per cent., and the berries had acquired a pale brown colour. This roasted product was found on analysis to contain 1·3 per cent. of caffeine, while the quantity calculated from the loss of weight and the amount of caffeine in the raw coffee was 1·28 per cent. The slight excess apparent from these results is to be ascribed to a trace of colouring matter from which it is very difficult to obtain the caffeine quite free. The amount is, however, too small to be of practical importance. The following table gives the data of the several experiments.

	Loss of weight in roasting coffee per cent.	Caffeine.		
		In raw coffee. per cent.	In roasted coffee.	
			Found per cent.	Calculated per cent.
Low roasted .	13·7	1·10	1·30	1·28
Medium do. .	16·0	1·10	1·36	1·31
Over roasted .	31·7	1·10	1·25	1·61

Of the loss of weight in roasting 8·22 per cent. was water that could be expelled by drying the coffee at 100° C.

The first two experiments may, we think, be taken as corresponding tolerably well with ordinary practice, and if it were not for the necessity of making provision for the production of a highly-coloured infusion to satisfy popular taste, we consider that a low degree of roasting would be preferable, if sufficient for the full development of the aroma. One hundredweight of coffee roasted as in the first experiment would yield a produce of 96½ pounds, while in roasting to a chestnut-brown colour, as in the second experiment, the produce would be only 94 pounds, but it appeared, so far as our experiments went, to have more aroma than when the roasting was not carried so far.

In the last-mentioned experiment, where there was a loss of caffeine, the temperature to which the berries were heated was probably sufficient to cause a partial volatilization of the caffeine and part of the ascertained deficiency may have been caused in this way. By roasting to this extent the produce from one hundredweight of raw coffee would be only 76½ pounds, and the too highly roasted product would also be deficient in aroma.

In the experiments made by Bernheimer* the roasting was carried so far that the loss of weight amounted to about 25 per cent. of the raw coffee, but the caffein found by him in the condensed product did not amount to more than 0·28 per cent., or somewhat less than we found the loss caused by over roasting.

We have not yet been able to make any minute examination of the products given off in roasting coffee. It may, however, be stated that by far the greater part consists of water which has a slight acid reaction owing to the presence of a minute quantity of an acid, probably acetic acid. There is also a very small quantity of an empyreumatic oily substance which increases in proportion as the roasting is carried to a greater degree. In an experiment made so as to condense and collect the volatile products given off, the roasting was continued until the loss of weight amounted to 21·2 per cent. of the raw coffee, and it was found that out of this 18·8 per cent. was obtained in the state of a condensed liquid. The remaining 2·4 per cent. was not condensed.

In roasting coffee on the large scale in revolving iron cylinders, the volatilized material is carried off by a kind of flue or chimney, the mouth of which is situated at the centre of one end of the cylinder. In the cooler part of the flue some condensation takes place, and from the lower extremity of it a watery liquid drops down, together with a quantity of the thin membranes which are detached from the berries, in the form of chaff or "flight," as they swell up in the process of roasting. This condensed

* *Pharmaceutical Journal*, Jan. 15, 1887, p. 565.

* *Monatshefte für Chemie, etc. Der Kaiserl. Akad.* Vienna, 1881, p. 457.

liquid often contains some caffeine, and a further quantity can be extracted from the damp mass of membranes collecting at the lower end of the flue. This circumstance would at first sight appear to favour the idea that caffeine is volatilized even in the ordinary roasting of coffee in a moderate degree; but a consideration of the conditions obtaining in a coffee-roasting cylinder shows that the presence of caffeine in these flue products may be otherwise accounted for. When the heat is first applied to a charge of raw coffee the hygroscopic moisture driven off from the berries in contact with the heated sides of the cylinder is again condensed to some extent in passing over the cooler portions of the charge, and while the water thus brought into contact with the berries dissolves some caffeine, this solution is absorbed by the thin membranes detached from the berries as the roasting progresses and carried away into the flue by the escaping vapour. This appears to be a much more probable explanation of the presence of caffeine in the flue products above the amount naturally present in the "flights," since the temperature in a roasting operation is not raised sufficiently to volatilize caffeine unless the roasting is carried to an excessive degree, as in our last experiment, where the loss of weight amounted to upwards of 31 per cent. of the raw coffee.

The experiments above described appear to corroborate the opinion already expressed in our previous paper (*ante*, p. 565) that there is no appreciable loss of caffeine by volatilization in the roasting operation, when it is carefully carried out, and from a number of trials of different samples the amount of caffeine in moderately roasted coffee may be fixed at 1·3 per cent.

2. Coffee Infusion.—The presence of caffeine in the infusion of coffee used as a beverage is undoubtedly an important factor to be considered in regard to the dietetic value of the preparation, and as the published statements on this point are discordant we thought it worth further inquiry. In making coffee with the simplest form of percolator, as commonly used in France, we found that employing fresh-ground coffee in the proportion of half an ounce to three fluid ounces of boiling water the extraction of the coffee was tolerably complete, and that in this way an infusion was obtained which contained greater part of the caffeine present in the coffee operated upon. Thus, for instance, in one experiment we obtained the following results :—

Roasted coffee taken	690 gr.	contained 8·97 gr. caffeine.
Grounds after percolation with 10 fl. oz. water . .	537 gr.	contained 1·09 gr. caffeine.
Extracted by water .	153 gr. or 22 p.c.	7·88 gr. caffeine.

In this case there was about 88 per cent. of the caffeine extracted, and the infusion was in other respects sufficiently strong for ordinary use, either as black coffee or for mixing with milk in equal proportions. The cup of 3 fluid ounces would contain rather more than 45 grains of extractive material, including nearly 2·36 grains of caffeine. This is a larger amount than is stated by Parkes in his quotation of Aubert's observations, acording to which the quantity of caffeine in a cup of coffee made from rather more than half an ounce of coffee is stated to be from 1·5 to 1·9 grain. As the medicinal dose of caffeine is from 1 to 5 grains, a cup of coffee made in the way above described may be expected to have a marked effect as a stimulant.

THE STINGING PROPERTY OF THE NILGIRI NETTLE.

BY DAVID HOOPER.

The hypothesis of Dr. Haberlandt regarding the property of the stinging hairs of nettles, given in a note by Mr. Bennett in the *Pharmaceutical Journal* of February 5, has both chemical and physiological interest. Last December I examined the stings of a tropical species of nettle, and obtained results which bear upon the subject, although they do not accord with the new theory of stings. A well-marked urticaceous plant grows on these hills called the Nilgiri nettle (*Girardinia palmata*, Weddl.) which is clothed with glandular hairs of from one-eighth to one-sixth inch long; the size of these hairs being larger than those of the urtica, and the previous remark of Mr. Bennett that the fluid of the latter had an alkaline reaction, prompted me to investigate the nature of the secretion. By separating several of the hairs, and breaking them up in a mortar with water, a solution was obtained which did not give definite enough reactions with reagents, on account of the interference of the juices of the plant contained in the epidermal cells. Several of the hairs were therefore taken separately and squeezed on to watch glasses, giving drops of liquid uncontaminated with any foreign matters. Working on these small quantities, and assisted by a microscope, I was enabled to gain an insight into the chemical property of the irritating liquid.

It was distinctly acid, having a sour taste, reddening litmus paper, and effervescing with carbonates. It was a volatile acid, dissipated rapidly when slightly warmed, giving off a pungent odour, and disappearing more slowly at a low temperature. It had a reducing effect upon silver and mercurous salts, converting them into their respective metals, instantly decolorized permanganate, and formed a salt of lead soluble in water, but insoluble in alcohol. The evidence of formic acid being present is sufficiently satisfactory, and Dr. Haberlandt does not deny its presence in the hairs of other stinging plants which he examined.

The liquid contents of the stings was perfectly transparent, and on gentle evaporation left an opaque residue, which was insoluble both in water and in alcohol. It was probably albuminous matter, as it gave off an unpleasant animal odour when burnt, resembling the casein of milk. After complete ignition, a trace of white ash was left partially soluble in water.

The action of the sting of the Nilgiri nettle may thus be described. About one minute after the sharp point has entered the skin and ejected the fluid the effect is experienced. A white swelling is made, accompanied with a peculiar tingling sensation. The irritation lasts for five minutes, and the swelling subsides in about an hour afterwards, leaving no distinct abrasure the day following. It should be noticed that if some of the fluid, after the minute wounded top is broken off, be placed on the skin, it will remain without producing any tingling or swelling; and if some of the liquid be placed actually on the tongue, nothing unpleasant is noticed. It is only by the contents of the hair being injected under the skin that the painful effect is shown. That the irritating property is due to a volatile substance and not to a fixed body may be proved by the energetic action of the stings taken from fresh plants as compared with the innocuous character of the same cells after

being bruised or taken from the plant a few hours after removal from the ground.

Of the three principles found in this nettle, formic acid in solution, albuminous matter and salts, there is a strong argument in favour of formic acid being the source of the irritation. Besides the tests employed, I lay great stress on its physiological action. Pure formic acid is well known to be a powerful corrosive, so that "a single drop placed upon a soft part of the skin produces intolerable pain, causing the part to swell and turn white, afterwards drawing the skin together and producing a painful ulcer" (Liebig). The pain, the swelling and the whitening of the skin were observed as the result of the sting, so that it might be inferred, if the action of a strong acid upon the skin be similar to the action of a small quantity of diluted acid beneath the epidermis, the acids are of the same nature.

In these notes I have refrained from using the word "poison" in speaking of the stinging property of nettles. My examination points to the presence of a dilute solution of formic acid in the sting, and its action as that of a temporary irritant. Unless a more toxic property is discovered in these plants, and until the "unformed ferment" of Dr. Haberlandt approaches the virus of the cobra, I think the term is inapplicable. Of course my remarks on this point refer only to the sting of the *Girardinia palmata*.

Ootacamund, Nilgiris, March 1, 1887.

CALIFORNIAN BUCKTHORNS USED IN MEDICINE.

In an article on "The Buckthorns of California," that appears in the *Pharmaceutical Record* for February 1, Mr. J. G. Steele describes four species of *Rhamnus* that are indigenous to the State of California. One of these, *Rhamnus alnifolia*, does not appear to be used in medicine. Another is *Rhamnus Purshiana*, the source of the "cascara sagrada" now official in the B.P., which plant is said to flourish in the northern part of California, Oregon, Washington Territory, and northward into British Columbia. The other two species, *R. crocea* and *R. californica*, are referred to in the following paragraphs :—

Rhamnus crocea.—Crocea, or California Mountain Holly Tree.—Much branched, 3 to 5 feet high (in some favourable positions, 8 to 10 feet), the young branches pubescent ; leaves evergreen, coriaceous, oblong or obovate to orbicular, obtuse or retuse or acute, equally variable at base, 3 to 18 lines long, acutely and often glandularly denticulate, glabrous, usually more or less yellowish-brown or copper-coloured beneath ; petioles, a line long or less ; flowers, tetramerous, apetalous ; fruit, about 3 lines long, obovoid, 2 to 4-lobed and $\frac{2}{4}$-seeded, bright red. Seeds and nutlets convex on the back, the raphe lateral; cotyledons fleshy, flat; flowers mostly perfect in pedunculate cymes. This variety of the Rhamnus family inhabits the hillsides and mountains of California from San Diego northward to Clear Lake, including the Yosemite Valley and the upper Sacramento Valley, and extends eastward into Arizona.

The wood of this variety is yellow or dark coloured, very fine grained and unusually heavy. Much difficulty is found when chopping to clear away land for cultivation, as the axes and like sharp cutting instruments were invariably found to be dulled. Subsequent investigation discovered the fact of the presence in the wood of a large amount of oxalate of lime, whereby this extraordinary fact was accounted for. It has even been used as "hones" for the sharpening of razors, knives, etc. The lustrous green colour of the upper surfaces of the leaves of this plant, together with their denticulations, caused it to be named "mountain holly." The ripe berries, possessing an agreeable acidulous taste, were much used by the native Indians for food, and their veins were not unfrequently tinged by the deposition of the red colouring matter contained therein. The bark of this variety of the Rhamnus is the part of the plant used in medicine, and is generally found in pieces of 1 to $2\frac{1}{2}$ inches in length, by about $\frac{1}{2}$ inch in breadth, slightly curved or quilled ; externally of a dark brown colour, and internally of a characteristic red, delicately and numerously veined or streaked with white, and of a pleasant, somewhat aromatic smell. When the bark of *R. crocea* is chewed, it generates an unusual flow of saliva, which becomes deeply tinged with the red colouring matter inherent to the bark. It excites a feeling of warmth in the mouth, which extends to the epigastrium when the juice is swallowed. The sense of warmth in the mouth is retained some time and followed by a peculiar, not unpleasant, bitter taste, with a sense of acridity which remains after the other sensations have passed away. The bark of this variety of the Rhamnus family is tonic and mildly laxative, and, in large doses, cathartic, but without that tendency to violent action frequently noted in the bark of the other varieties. Crocea bark, from its mild action, is particularly indicated for women and children of delicate taste and enfeebled condition, whose systems reject, as it were, the more violent acting purges and hydragogue cathartics. Water or alcohol extract the virtues of this bark, and a fluid extract made of the usual strength (16 troy ounces to the pint) can be given in adult doses of 1 to 3 fluid drachms once or twice a day.

Rhamnus Californica.—California Buckthorn. Wild Coffee Tree.—A spreading shrub, not infrequently small trees, from 4 to 18 feet high ; young branches somewhat tomentose ; leaves ovate-oblong to elliptical, 1 to 4 inches long, $\frac{1}{2}$ to $1\frac{1}{2}$ wide, acuto-obtuse, mostly rounded at base, denticular or nearly, entire evergreen ; peduncles, with numerous mostly abortive flowers in subumbellate fascicles ; calyx usually 5-cleft ; petals very small, broadly ovate, emarginate ; fruit, blackish-purple, with thin pulp, three or four lines in diameter, 2-3-lobed and 2-3-seeded. Habitat, California, from the northern or upper Sacramento Valley and the Klamath Lake to Santa Barbara and Fort Tejon. This variety extends to the southern boundary of the State and eastward through Arizona into New Mexico.

This variety of the Rhamnus family occurs mostly in California. While it often is found growing as a thickly foliaged shrub from 6 to 10 feet in height it is often met with, particularly on the banks of streams and around water courses, as a small tree 18 to 20 feet high, growing in clumps or clusters of eight to twelve trees, the ordinary diameter of the stem being 2 to 4 inches. The bark has a peculiar greyish white, changing in drying (after having been removed from the tree) to a dark brownish colour. The foliage is dense, and of a darker green than the surrounding vegetation. It is best felled in the spring when the sap is running, and when the bark is easily peeled from the trunks and branches. The fruit contains two or three coffee shaped seeds, hence the misnomer "wild coffee tree," by which it is known among the country people. The bark of the *R. Californica*, the part used in medicine, is found in pieces of varying size, depending on the size of the tree or branches from which it was obtained. It is of a dark brown or blue colour externally, and of a bright yellow internally—that is, when properly cured. It is of an intensely bitter taste, leaving a very persistent after-taste somewhat nauseous, of little or no odour, thereby differing from its near relative the "cascara sagrada" (*Rhamnus Purshiana*). This bark has been long held in repute among the ranchmen and cultivators of California as a specific in all troubles arising from constipation and dyspepsia, a cold aqueous infusion being made and one or two wine-glassfuls drunk for a dose, repeated when necessary once or twice in the

twenty-four hours. In the form of a fluid extract, some considerable attention has been paid to this remedy by many California physicians. The medicine has been frequently prescribed in cases of constipation characterized by atony with the happiest results. Some objection is occasionally made, especially from women and children, to the decidedly bitter taste of this new therapeutic agent; but this is easily corrected by the use of well-known adjuvants, such as aromatic or simple elixir, syrup of fresh orange peel, the compound tincture of cardamon, essence of anise, etc. Several cases of paresis of the muscular coat of the bowels, induced by a catarrhal condition of the stomach and intestines, were brought under submission by the judicious use of this remedy. The result of the experience of many of our medical practitioners seems to be that this medicine is almost—say quite—specific in cases of obstinate and prolonged constipation accompanied by sympathetic derangement of the digestive tract. The fluid extract given in doses of 30 to 50 drops, one to three times a day, according to the case, generally gives painless evacuations and increases the appetite, thereby exerting its tonic effect. After bringing the system well under the effect of the medicine it has been found advisable to gradually diminish the dose. Many cases of constipation in women, where the colon had been allowed to distend, from neglect and inattention, came under the observation of the physician. The bark of the *R. Californica* judiciously administered always proves efficient, and much benefit has been derived in some cases (where there proved to be no pelvic or uterine difficulty) by combining the medicine with aloes, and thus operating on the whole bowel. The following was a favourite prescription of the late Dr. R. McMillan :—

℞	Fld. ext. rham. califor.	1½ oz.
	Fld. ext. yerba buena	½ oz.
	Fld. ext. aloes	⅛ oz.
	Tinct. cardam. comp.	2 oz.
	Simple elixir . . . . q.s. to make	8 oz.

S. One tablespoonful night and morning.

Many cases of "biliousness" present themselves—really cases of chronic constipation, and sometimes puzzle the physician. The following formula has been used with advantage :—

℞	Sodium phosphate	2 oz.
	Fl. ext. rhamnus cathart.	2 oz.
	Essence anise	¼ oz.
	Syrup orange peel	2 oz.
	Dist. water . . . . . .to make	8 oz.

Dose: One or two tablespoonfuls at bedtime. In cases of expected "sick headache," arising from above causes, a dose of this combination will invariably arrest it. Some claim that the action of this therapeutic agent is directly upon the nerve terminals, in this way reflectly stimulating muscular contractibility and glandular secretions. The exact points of difference or concord proximately considered between this bark and of its "cousin," that of the *R. Purshiana*, have yet to be demonstrated.

THE ECONOMIC RESOURCES OF INDIA.

A paper on the above subject was read recently before the Indian Section of the Society of Arts, by Dr. George Watt, C.I.E., containing several references to products more or less interesting to the readers of this Journal. The paper is printed *in extenso* in the *Journal of the Society of Arts*, from which the following paragraphs are quoted :—

The Imperfectly Known, or Minor Products of India.—It would be hopeless to attempt to enumerate, even by name, the multitude of natural or wild products in which trade might be done. Seeds which will yet have a commercial value as ornaments and buttons. Fibres which are likely to be used as useful and cheap substitutes for whalebone and bristles. Palm spathes, which may come into use as natural surgical splints, or be employed as simple mechanical filters. The fibrovascular frameworks of cucurbitaceous fruits, which constitute admirable bath-room sponges. Small pieces of *solah* pith to displace patent corn-plasters, or to be used in place of wax in the preparation of microscopic sections. The employment of pith instead of cork for many purposes, such as for floats to fishing nets. Fungi and pith utilized as substitutes for felt in the manufacture of at least certain parts of hats. The gums and resins, which have each their peculiar properties—properties far better known to the simple and primitive aboriginal inhabitants of the wild forest tracts than to the professional experts of Europe, who often value samples according to a crude standpoint, viz., the colour, appearance, and condition of package demanded by the trade. This standpoint is conservative to established brands, but precludes the possibility of the properties of new products being investigated. The practice of the simple *Santal* in mending his iron cooking pot by means of the *sal* resin (the resin of *Shorea robusta*) suggests a use for that, at present, valueless substance, as it indicates also a personal acquaintance with its properties. It is not at all improbable that the properties of this and many other little-known gums and resins will commend themselves in the future to persons who may be in search of substances with properties we have not as yet been educated to require. The useless hog-gum (the gum of *Cochlospermum Gossypium*), consigned falsely as tragacanth, has been accidentally discovered by the bookbinder to be invaluable for marbling purposes, and the gum of *Sterculia urens* has been found to restore to tasar silk the lustre removed from it during an improved process of reeling that fibre. Practically, the one requirement for gum in Europe is a strong and useful adhesive mucilage, and although, with care in selection and packing, India might easily come to play a much more important part in this trade than it has done in the past, India has, at the same time, gums and resins which possess distinctive properties, each one of which finds in India a market in meeting the demands of some indigenous industry.

Pulses.—A small amount of Indian peas, beans and pulses are regularly exported to Europe, but it would seem that the properties of one or two of the best Indian sorts are not understood, otherwise a much greater trade would be done in them. It is a common error to say that rice is the staple food of the people of India. It is the staple of perhaps 80,000,000 or 90,000,000 out of the 253,000,000 of people of India. Millets and pulses, with a little rice, wheat or maize as luxuries, are the food stuffs of the great bulk of the inhabitants of India. Even the rice-eating people rarely eat rice alone. The muscle-forming ingredient in their diet is the pigeon-pea, or *dhal* (*Cajanus indicus*), one of the best and most nourishing of Indian pulses. This is eaten in various ways, but a sort of thick pea-soup poured over boiled rice is perhaps the most frequent preparation. The pigeon-pea is, however, by no means the best pea in India, although from its abundance and cheapness it is the one of which the greatest hope may be entertained for a future export trade. The soy-bean (*Glycine Soja*) is more expensive than *dhal*, but it is much more nutritious. Indeed it is entitled to the highest place amongst all known pulse, its nutrient value being 105, as compared to 80 to 87 for the nutrient values of peas and lentils. At the present day both *dhal* and *soya* are only imported into this country in small quantities, being employed almost entirely in the preparation of patent foods for infants and invalids. They are as ordinary articles of diet brought into competition with English, American and Egyptian peas and lentils, but it is highly probable that were their claims for consideration only urged a little more freely a large trade might spring up in these useful food substances. Perhaps no other Indian pulse deserves, however, greater attention than the chicken pea, or *gram* (*Cicer arietinum*). Horses in India are universally and in many instances exclusively, feed upon this seed. The allowance is soaked in water

for an hour or so before being given to the horse. This has the effect of both softening the seed and freeing it from mud. About eight to ten pounds a day is considered an abundant supply along with grass or hay. A more rational diet is, however, to crush the *gram* along with about an equal quantity of corn. This diet, from a scientific point of view, ought to prove more wholesome than gram alone. It must be admitted that horses in, perhaps, no other part of the world are in better condition than the Indian gram-fed carriage horses, and sheep reared upon gram are proverbial as affording admirable mutton. Within recent years an immense trade in Indian corn has come into existence in England for the purpose of feeding horses, crushed Indian corn being mixed with oats. Chemically, a horse diet which consists exclusively of cereals cannot be so good for the animal, nor so likely to produce muscular strength, as a diet with a liberal admixture of some kind of peas. Husked gram contains of albuminoids 21·7 per cent., and of starch 59·0 per cent. Indian corn contains of albuminoids only 9·5 per cent. to 70·7 per cent. of starch. When it is recollected that the albuminoids are the muscle-forming constituents of diet, it becomes apparent that a diet which would contain oats and gram, or Indian corn and gram, would be far more nutritious and strength-giving than the modern English food for horses of oats and Indian corn. To obtain the indispensably necessary amount of albuminoids from an English diet the animal has to eat a greatly excessive and injurious amount of starch. From these considerations it would appear that the food given to horses in India is a much more rational one than that which prevails in England, and it is therefore possible that a large trade may spring up in Indian gram when once these facts are brought home to the attention of persons interested in feeding large quantities of horses, such as our omnibus and tramway companies.

Fruits and Nuts.—There are so many other food substances of which one might speak, that it is difficult to restrict one's observations to one thing more than another. The trade in *mahua* flowers (the flowers of *Bassia latifolia*) has received a sudden check from the action of the French Government. In addition to being invaluable for the purpose of feeding pigs it was early discovered that these flowers might, and were being used in distillation. Fiscal restrictions have thus injured the trade in an article which, but for this difficulty, promised to come into extensive use. Both the oil from the seeds and the sweet nutritious flowers are articles of the greatest importance to the inhabitants of the central table-land of India. The oil bids fair to come into European commerce for the candle and soap trade. Many of the preserved fruits of India seem hopeful articles of future export trade. The sun-dried apricots of Afghanistan are particularly deserving of attention. Of the nuts, the Singara (*Trapa bispinosa*) is, perhaps, one of those novelties that one cannot help feeling surprised at its not having found its way to Europe. In Kashmir alone it is stated that 30,000 persons are dependent upon this wild aquatic plant. The pistachio-nut (the seed of *Pistachia vera*) is another equally deserving nut, which would seem likely to be run upon were it once introduced into Europe. But one might enumerate a long wearisome list of fruits, for the tamarind, the Bokhara plum, the Indian date, the edible pine, and a host of other nuts and fruits have still to be introduced into European trade. Even arrowroot, which is now manufactured all over India, has not as yet attained to a commercial position.

Drugs, etc.—Under the heading of drugs, allusion may be made to cinchona only in passing. A few years ago, after much trouble, Government succeeded in introducing a few live cinchona plants into India. The late Dr. F. Royle, in 1852, first recommended that an effort should be made to cultivate cinchona in India, but nothing was done in that direction until 1859. Cinchona has not only been successfully introduced into India, but has been so overgrown that the bark has fallen to an almost ruinous extent. The benefit to India of her cinchona plantations cannot, however, be over-estimated, but it is much to be regretted, in the interests of the fever-stricken millions, that the tremendous fall in the price realized by the bark has not been accompanied by a corresponding fall in the price of the alkaloid. With the exception of opium, no other drug of any importance is cultivated in India; but it cannot be too strongly urged that the people of India are made to pay too dearly for their drugs, since most of the drugs which might easily be grown in India are entirely imported from Europe. Even aconite, a wild plant in Nepal, seems to be first exported to England, and then re-imported to India. While little reliance can be put in the bulk of the drugs collected in the jungles by the people of India, a distinct percentage of them, if more carefully investigated, might fairly come to take the place of the expensive imported medicines, and thus for the same money admit of dispensary aid being extended to a much larger community than is the case at present. A few of the more important drugs of India have been sufficiently brought to the attention of the medical authorities of Europe to require little more than to be here mentioned by name, such as *chaulmugra* oil; *bael* fruit; ditaine, from the bark of *Alstonia scholaris*; the bark of *Caloptris gigantea*; the bitter roots of the *Mishmee teeta*; the bark and seeds of *Holarrhena antidysenterica*; the bark of *Hymenodictyon excelsum*; the *kamela* powder (a useful anthelmintic and vermifuge); the flowers and leaves of the *gao-zabân*; the tonic roots of the *Picrorhiza Kurrooa*; the *ispaghul*, a useful and simple drug in the treatment of dysentery; the healing oil from the seeds of *Pongamia glabra*; the astringent bark of *Soymida febrifuga*. These and a few other indigenous drugs, if they are never likely to become articles of export trade, might at least be more generally used in dispensary practice, so as to lessen the charges on imported drugs. The subject of Indian hemp may here deserve a passing consideration. The narcotic from this plant is extensively used by the people of India. The extract secreted on the female flowers constitutes the *ganja*, which is smoked; the dried leaves constitute *bhang*, the substance employed in preparing the intoxicating beverage known as *haschisch*, and the intoxicating sweetmeats *majun*. *Charas* is a special resinous substance, prepared in Northern India, and is more expensive and more intoxicating than either *ganja* or *bhang*. The European medicinal preparation—the extract—is reputed to have recently fallen off in strength, so much so, that it is far less used than in former years. This may be accounted for by the fact that in Bengal, where the best qualities of *ganja* and *bhang* are grown, a duty which amounts to as much as £30 to £40 on each maund is realized by Government, whereas in Madras no duty whatever is collected, and only a nominal duty in Bombay. This has doubtless led to the better and more expensive forms ceasing to be exported to Europe. There is little doubt, however, that if this were to be corrected by Bengal *ganja* being procured, the extract of its former quality might easily enough be produced. It is customary to see in the returns of Bombay mention of exports of Bengal *ganja*, but as the price quoted is only about 2*s*. a pound, and no *ganja* can leave the Government stores in Bengal until it has paid a duty which, together with the charge for cultivation, brings every 16 ounces of the article up to a price close upon £1 sterling, the so-called Bengal *ganja* exported from Bombay cannot possibly have come from Bengal, a fact which is worthy of careful consideration by persons wishing to manufacture the liquid extract of Indian hemp.

JAPANESE TEA.

In the 'Proceedings of the German Naturalists' Society for Eastern Asia,' held at Yokohama, Messrs. Kellner, Makino and Ogasawara give some interesting details of the mode of preparation and composition of Japa-

nese tea. They state that the preparation differs from that of Chinese tea, chiefly in this; that the leaves are not intentionally allowed to ferment, but after moistening and cooling are at once placed in the oven; and also that the prepared tea is not flavoured with fragrant flowers. The amount of theine is from 2 to 4 per cent.; of tannin 17 to 20 per cent. The aqueous decoction contains chiefly tannin, theine and mineral substances.

As is the case with all alimentary substances which are chiefly valued for their taste and fragrance, chemical analysis gives but little indication of the value of tea for commercial purposes. It is of importance for detecting adulterations, and also serves to show whether the leaves are older or younger; from old leaves no tea of good quality can be obtained. The following are some of the points in which older and younger leaves differ from one another chemically.

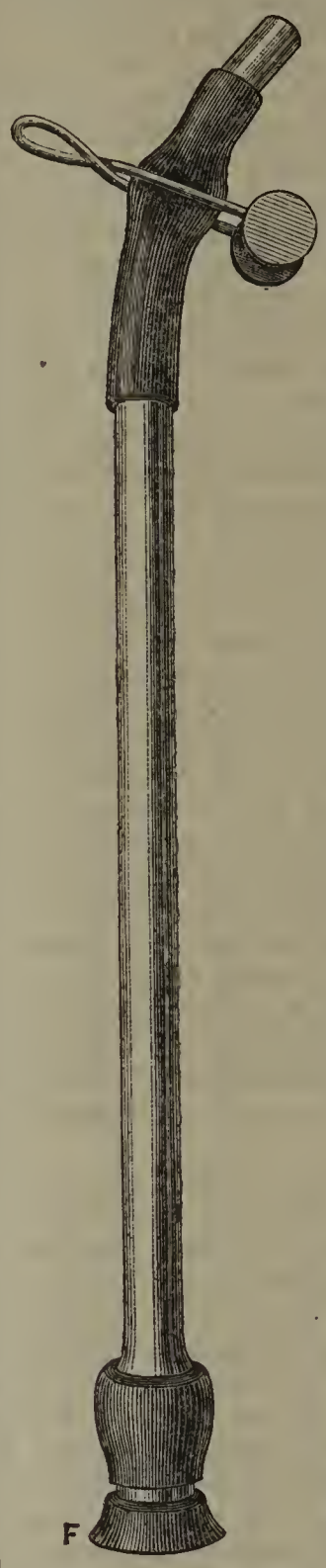
The evergreen organs of the tea-plant exhibit phenomena during their first period of growth, very similar to those which take place in the leaves of conifers; and, like them, they retain, even when old, a large quantity of proteinaceous substances and carbohydrates. It is true that, in consequence of the fresh formation of organic substance, the amount of nitrogenous constituents, including theine, diminishes slowly and regularly, as also the soluble non-nitrogenous substances, while the fatty constituents accumulate rapidly, and, to a remarkable extent, apparently in consequence of the formation of wax. The amount of woody fibre increases very rapidly during the first weeks, and after that remains nearly constant. The greatest changes are exhibited in the composition of the ash; the proportions of potash and phosphoric acid diminish very rapidly, while those of lime, magnesia and oxide of iron increase to a corresponding extent.

NOTE ON A MODIFIED FORM OF "FILTER-TUBE" FOR USE IN THE ESTIMATION OF ALKALOIDS BY MAYER'S REAGENT.*

BY F. C. J. BIRD.

Those who have had occasion to estimate alkaloids volumetrically by Mayer's reagent, must have been troubled by the extreme tediousness of the process. When the precipitant is added to the liquid containing the alkaloid to be estimated, a precipitate is formed of so fine a nature that a considerable time is required for it to subside sufficiently so as to leave a clear stratum of liquid for the further application of the test. This difficulty may be overcome in some cases perhaps by the use of the "filter-tube" designed by Mr. A. W. Blyth, M.R.C.S., and described by him in a communication read before the Society of Public Analysts, in June, 1881 (*Analyst*, vi., 162). Unfortunately, however, as there figured, the filter-tube is only applicable in those cases in which the precipitate readily aggregates into fairly large particles, for in the words of Mr. Blyth himself, "when 'Mayer' is added directly to quinine wine, tinctures, etc., the precipitate, instead of being flocculent and readily separating, is so excessively fine, that however lightly you pack the filter-tube, it is difficult to get a really clear drop, and the process though still accurate becomes tedious, consuming much time." Mr. Blyth's filter-tube consists of a short piece of glass tubing, one end of which has been enlarged to a funnel shape, forming a minute funnel which is packed with glass wool, and slipped on to the end of another piece of tubing about 8 or 10 inches long by means of a close fitting yet easy piece of rubber. By immersing the funnel end in the tincture or other liquid containing the Mayer precipitate, it is easy to suck up a clear drop of liquid, and by placing this clear drop in a watch glass standing on a black surface, the addition of a droplet of the reagent will show whether all the alkaloid has separated or not.

The modification of the above which I wish to bring under the notice of the Association is made in the following manner. A piece of glass tubing of about three-sixteenths in bore is heated and compressed near one end until its diameter is increased by about one half; the enlarged portion is then drawn out to a point like a pipette. The other end is fitted with a piece of stout rubber tubing, a burette clamp, and a short glass tube to serve as a mouthpiece. One end of another piece of glass tubing is then enlarged to the shape of a small funnel, and cut off at about three-quarters of an inch from the enlarged end. A circle of the filtering medium, consisting of thick filtering paper placed between two pieces of fine muslin, is placed over the mouth of the funnel, turned down all round, and secured in position by slipping over the whole a piece of stout rubber tubing three-eighths of an inch in length. To the stem of the funnel another piece of rubber tubing is cemented, leaving about three-quarters of an inch projecting, and the pipette portion having been inserted into this the instrument is complete.



Section of filter.

Before use the filtering medium must be prepared by mixing a little finely powdered French chalk with water, and having immersed in the mixture the end (F) of the filter-tube, sucking at the mouthpiece until the filtrate passes through perfectly clear. When, however, a liquid containing a Mayer's precipitate is being filtered, it will be found that considerable force is required to draw the liquor through, and the operation becomes very fatiguing. The clamp is intended to obviate this, for having sucked the air out of the tube as completely as possible, the clamp is closed, and the liquid gradually rises of its own accord into the vacuum existing inside the tube. The pipette may then be disconnected from the filter and by compressing the rubber tubing between the finger and thumb at the point between the clamp and the top of the long glass tube, a drop of the clear filtrate may be forced out into a watch glass, and tested with a drop of Mayer's reagent; then by opening the clamp, the remainder of the liquid flows back into the bulk which is being estimated.

It is always advisable that the liquid filter into the pipette to the height of 2 or 3 inches, so that all traces of the preceding filtrate may be washed through, and a representative sample obtained.

The volumetric estimation of alkaloids by Mayer's reagent is generally a very tedious operation, owing to the large amount of time which is consumed in waiting for the finely-divided precipitates to subside, but by the use of the filter tube an analysis can be performed with comparative rapidity; and it is probable that in other estimations involving a similar difficulty, such as the titration of lead salts with oxalic acid, etc., this simple instrument would be found of service.

* Read at a meeting of the Chemists' Assistants' Association, Wednesday, March 30.

The Pharmaceutical Journal.

SATURDAY, APRIL 9, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE GOVERNMENT VISITOR'S REPORTS ON THE SOCIETY'S EXAMINATIONS.

AT the late meeting of the Council the reports of the Government Visitor on the Pharmaceutical Examinations held in London for the years 1885 and 1886 were laid on the table, as having just been received from the Privy Council Office, and as usual they will be found to contain much suggestive matter that calls for careful consideration by all who take any interest in the future of pharmacy in this country. In the first place it may be useful, in the face of a somewhat vague idea that the examinations have been made more stringent, to call attention to the statement with which the report for 1885 commences, to the effect that the examinations had been conducted in the usual manner, and that there was nothing unusual in their management that required notice. In the report for 1886 the same opinion is expressed in reference to each of the examinations; thus, for instance, the questions set in the Preliminary examination were considered by Dr. GREENHOW to be fair, and not more difficult than was necessary in order to test the elementary education of the candidates in relation to their intended future calling as dispensers of medicine. In regard to the Minor examination, which is of the greatest importance from a public point of view, as being the test of qualification for exercising the business of chemist and druggist in conformity with the law, Dr. GREENHOW is also of opinion that it is conducted with fairness and impartiality. Then, in reference to the Major examination, which has for a section of the pharmaceutical community the chief interest, Dr. GREENHOW reports that there has been no change either in the mode of conducting it or in its strictness. This testimony of a perfectly impartial authority ought to be conclusive as an answer to the not infrequent assumption that there has been an increase in the stringency of any of the examinations and that the large proportion of failures among the candidates should be ascribed to such increased stringency. It is not in this direction that the cause of the failure of candidates to pass the examinations must be sought for, and it is especially usual at the present time that Dr. GREENHOW'S reports on the examinations of the past two years should furnish a clear indication of the causes to which those lamentable failures are really attributable.

Though this subject has already been frequently dealt with in these pages, it is of such vast importance that no apology is necessary for again reverting to it for the purpose of pointing out the circumstances which have led to the rejection of candidates. Taking the Minor examination first, as being of most practical importance, it appears that in 1885 as many as 489 out of 744 candidates were rejected, while in 1886 no less than 530 out of 824 were rejected, and Dr. GREENHOW gives the particulars of these failures as follows:—

Subjects.	1885.	1886.
Practical dispensing	171	205
Reading prescriptions . . .	43	57
Pharmacy	64	82
Materia medica	22	34
Chemistry	70	71
Botany	27	25

It is not to be wondered at that the attention of the Government Visitor should have been attracted by this large proportion of failures, amounting to from 63 to nearly 66 per cent. of the total number of candidates presenting themselves to obtain legal qualification as chemists and druggists, and it is natural that he should have applied himself to watch very closely in order to ascertain whether this circumstance might be accounted for in some degree by greater strictness on the part of some of the examiners. But, having done so, he states as the result of his observation, that he is bound to say he has been unable to find any ground for attributing these failures to any other cause than "the incompetence of the candidates." Here, then, is evidence of the existence of an evil of serious magnitude, one that threatens to exercise a most prejudicial influence in the future upon the interests of pharmacists. For it must be remembered that these candidates who fail to pass the qualifying examination have already been engaged for some years in the business as apprentices or assistants, and, from the time they have devoted to it, are in a great measure compelled to look upon it as the occupation upon which their future maintenance depends. If they are unable to obtain legal qualification there is a probability of their being induced to engage in irregular practices or to have recourse to any opportunities of avoiding the provisions of the Pharmacy Act. It cannot be otherwise than detrimental to the interests of qualified chemists and druggists that upwards of one-half of the young men engaged in the business should be thus forced to swell the ranks of abnormal competitors. Nor is such a state of things free from serious disadvantage from the point of view of the public interest. The nature of the subjects in which the candidates fail to such a large extent proves that they are deficient in knowledge which is essential for carrying on the business of a chemist and druggist with due care for the public safety, and though Dr. GREENHOW is still of opinion that those who

pass the examination are really qualified for their calling, the general experience gained as to the value of examinations as a test of qualification furnishes some ground for doubting whether the meshes of the examination room are always effective in preventing some from slipping through who ought not.

This view of the matter appears indeed to have presented itself to Dr. GREENHOW, if we may judge from his remark that he has found occasion to suggest modifications in the mode of conducting the examinations, with a view to increasing their practical efficiency. This has been the case chiefly in regard to the subjects of practical dispensing and pharmacy, and the Board of Examiners has resolved that such a change should be carried out as will afford candidates a wider range for exercising their abilities. But probably the most important feature of Dr. GREENHOW'S reports is that which points to the deficiency of practical training on the part of candidates. In both of the reports, this deficiency is spoken of as being in Dr. GREENHOW'S opinion the sole cause of the failures that occur among the candidates presenting themselves for the Minor examination. Imperfect early education has in some instances contributed to this result, since apprentices have occupied the time which should have been devoted to learning the practical part of the business with studying for the Preliminary examination, which is really a schoolboy's examination that ought to have been passed before entering upon apprenticeship. In this respect the existing regulations are eminently defective, and though Dr. GREENHOW has always insisted upon the necessity for the passing of the Preliminary examination being made a condition of apprenticeship, this important desideratum has still to be carried out.

At this as well as other stages of the career of a pharmaceutical student it is now a matter of accident whether his education and his technical training are adequate and sufficient to enable him eventually to satisfy the requirements of the law for obtaining qualification and to fulfil the duties connected with the occupation by which he expects to make his living. For want of a definite educational system the apprentice is unable to form an opinion of his fitness or even his inclination to undertake the necessary studies, and it is not until after he has wasted several of the most precious years of his life that he discovers he is entirely unsuited for the calling to which he has half unconsciously sought admission. Many who find themselves in this position must turn to other occupations, and probably at great disadvantage to themselves. Obviously, therefore, it would be much better, as Dr. GREENHOW remarks, that such men should be set free at an early period of life to look out, ere it is too late, for an occupation better suited to their capacity. It seems, indeed, scarcely possible to imagine a stronger argument in favour of the adoption of a pharmaceutical curriculum than that which is furnished by the facts referred to in these reports.

The last Evening Meeting of the Pharmaceutical Society in London for the present session will be held on Wednesday next, the 13th inst., at eight o'clock precisely. The papers to be read are "The Pharmaceutical Preparations of Atropa Belladonna, Part III.: Suggestions for Standardized Galenical Preparations," by Professor Dunstan and Mr. F. Ransom; "The Pharmaceutical Test for the Purity of Ether," by Professor Dunstan and Mr. T. S. Dymond; "Remarks on a Resin from the Ruins of Defeneh, in Egypt," by E. M. Holmes, F.L.S.; and a "Note on *Huechys sanguinea*," by J. Moss, F.I.C. Among the objects of interest that will be exhibited, and for the inspection of which the theatre will be opened an hour before the meeting, will be some models of the apparatus used in China for distilling peppermint oil and in expressing oil seeds.

* * *

In Edinburgh also, there will be an Evening Meeting of the Society held on Wednesday next, at 36, York Place, when the papers read will be—"Solubility of Gelatin as compared with other kinds of Pill Coating, with a note on Blaud's Pill Mass," by Mr. T. Thompson; and "Notes on Blaud's Pills," by Mr. P. Boa. The chair will be taken at half-past eight o'clock.

* * *

A correspondent has kindly brought under our notice a transcript from a leaf pasted into a copy of 'Gerarde's Herball,' edit. 1630, in which the words "clariss. Societ. pharmaceut. Lond." occur, and he asks for information bearing on the existence of a Pharmaceutical Society two hundred and fifty years ago. There can be little doubt that the leaf referred to originally belonged to the volume in which it was found, since the transcript is identical with the words used by Thomas Johnson in the dedication of his enlarged and amended edition of the 'Herball.' The dedication is as follows:—"Viris prudentia, virtute, arte, rerumque usu spectatissimis dignissimis Richardo Edwardo rectori, sive magistro; Edwardo Cooke, Leonardo Stone, guardianis ceterisque clariss. societ. pharmaceut. Lond. sociis hos suos in emaculando, augendoque hanc plantarum historiam labores studiorum botanicorum specimen, amores symbolum ex animo D. D. vestrae, publicaeque utilitatis studiosissimus Thom. Johnson." Of course, the "clarissima Societas Pharmaceutica Londinensis" here mentioned was the Society of Apothecaries, which had a few years previously separated from the Company of Grocers and had been constituted an independent corporation by royal charter. The duties of the Society of Apothecaries were then limited more closely to those now usually associated with the word "pharmaceutical," since the charter gave the new Society the right to prevent any person who had not served an apprenticeship of at least seven years to an apothecary, in the pharmaceutical sense of the word, and received the approval of the College of Physicians, from keeping a shop for the preparing, dispensing, commixing or compounding of medicines. The Society also had the power to search the shops of apothecaries and others for unwholesome drugs; but curiously enough the monopoly of the garbling of spices and drugs coming into London seems to have remained with the grocers for several years longer. The application of this title to the Society of Apothecaries is not at all singular, however, since it occurs in the title-pages of several other books in the Society's library. For

instance, "Index Plantarum Officinalium quæ ad Materiæ Medicæ Scientiam Promovendam in Horto Chelseiano, ali ac demonstrari curavit Societas Pharmaceutica Londinensis. Londini: Imprimebat J. W. MDCCXXX." Indeed the words "in horto Societatis Pharmaceuticæ Londinensis" occur in the title-page of an edition of the catalogue of plants in the Chelsea Gardens published so recently as the year 1830, or only twelve years previous to the incorporation of the Pharmaceutical Society.

* * *

The Committee engaged in preparing a seventh edition of the Austrian Pharmacopœia has so far progressed with its work as to issue a provisional list of the articles it is proposed to include. From this it appears that seventy-six new articles are proposed to be included for the first time, whilst seventy-two now official would be omitted. It is also proposed to have a section for surgical dressings.

* * *

A correspondent, who for some time occupied an official position at Lofoten, in Norway, has furnished the following particulars concerning the cod-fisheries there, which will probably be of interest. The fishing for cod begins about the 14th of January, and ends on or before the 14th of April. The first ten weeks of this year were stormy beyond precedent, and the official reports showed that the yield was only 6,500,000 fish and 1800 hectolitres of oil for medicinal purposes. The gloomy prospect which had prevailed up to that time was changed about the second week in March, and enormous quantities of fish were landed after that time, as will be seen from the following comparison with previous years.

			Catch of fish. Millions.	Livers. Hecto-litres.	Medicinal oil. Hecto-litres.
Season 1887 to	March	26	$25\frac{1}{2}$	32,300	8044
„ 1886	„	27	25	34,700	9329
„ 1885	„	28	$24\frac{2}{10}$	27,500	6270

Cod liver has been very cheap this year, especially in East Lofoten, where the great rush took place. Remembering that large quantities of 1886 and 1835 medicinal oil are still unsold, the probability is that this year's finest quality of oil will be obtainable at a moderate price.

* * *

The arrangements for the Friday Evening Meetings at the Royal Institution after Easter include discourses on "The Work of the Imperial Institute," by Sir F. Abel (April 22); "The Rolling Contact of Bodies," by Professor H. S. Hele Shaw (April 29); "Some Electrical Fishes," by Professor J. S. Burdon Sanderson (May 13); "Etiology of Scarlet Fever," by Dr. Klein (May 27); and "The Application of Photography to Astronomy," by Dr. Gill (June 3).

* * *

A meeting of the Midland Counties Chemists' Association will be held at the Grand Hotel, Birmingham, on Thursday evening, the 21st inst., at half-past eight o'clock, when papers will be read on "The Composition of the Ash of Ipecacuanha Root," by Mr. H. E. Munns; "A Note on Linimentum Terebinthinæ," by Mr. G. E. Perry; and "Tincture of Quinine and its Assay," by Mr. F. H. Alcock.

* * *

The Chemists' Assistants' Association will hold a Musical and Social Evening Meeting at the rooms in Great Russell Street on Thursday next, April 14.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, April 6, 1887.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

MR. T. P. GOSTLING, VICE PRESIDENT.

Messrs. Allen, Atkins, Baildon, Bottle, Butt, Cross, Greenish, Hills, Radley, Richardson, Robbins, Savage, Schacht, Southall, Symes, Williams and Woolley.

The minutes of the previous meeting were read and confirmed.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Everard, Arthur George .....Brighton.
Wright, Herbert Cassin .....London.

Chemist and Druggist.

William Flower, of Beccles, who was registered as being in business on his own account before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society

ASSOCIATES IN BUSINESS.

The following, having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Bletsoe, Francis Ferriman .....London.
Brighouse, Charles Davidson ...Hull.
Clague, Thomas Maltby .....Newcastle-on-Tyne
Crompton, Alfred, jun. .....Bury.
Davies, Henry Morgan .....Blaenavon.
Deakin, John William .....Northwich.
Gardner, Edward.....Salford.
Harrison, John Paul .....Hale.
Holl, Edmund .....Lewisham.
Hucklebridge, Philip .....London.
Jackson, William Moses.....Ayr.
Jones, Nathaniel Stevens .....London.
Lodge, Arthur William .....London.
McMurtrie, John.....Macduff.
McNay, David.....Thornhill.
Martin, John Bennet .....Helston.
Peacock, George .....Kirby Moorside.
Pegg, James Alfred.....Mansfield.
Price, John .....Sunbury-on-Thames.
Radcliffe, John Collister.....Douglas (I. of M.).
Salter, Thomas.....Bradninch.
Widgery, John .....London.
Wright, William .....Lockerbie.

Modified.

Payne, John Buxton .....Newcastle-on-Tyne.

ASSOCIATES.

The following, having passed the Minor examination and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Bisset, James .....Burntisland.
Calvert, Albert Matheson .....Belper.
Cole, John Frederick .....Worcester.
Collins, Alfred .....Bradford.
Day, Henry William .....Margate.
Felton, William .....Maidstone.
Flynn, William .....Lockerbie.

Forbes, Alexander .....Fraserburgh.
Gwillim, Walter Robert .....Abergavenny.
Hamer, Edward Sidebottom ...Pendleton.
Jenkins, John Lewis .....St. Clears.
Johnson, Charles Ernest .....London.
Lance, Henry .....Bow.
Palmer, Charles Joseph .....Wingham.
Pickering, Charles Edward ...Stockton-on-Tees.
Poll, William George .....Great Yarmouth.
Upson, Arthur .....Southampton.
Wright, Joseph Pretty .....Burton-on-Trent.
Young, Edward .....Sudbury.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Atkinson, Alfred .....Bishop Mills.
Beard, Albert Edward.....Haddenham.
Brampton, Isaac Arthur.....Birmingham.
Cooper, Reginald Edwin.....London.
Cowper, Joseph .....Penrith.
Crane, John Hammond .....London.
Cutmore, Frank .....Totnes.
Edwards, David Richard .....Carmarthen.
Ferryman, Herbert .....Rugby.
Franklin, John William.....Gloucester.
Gardner, John .....Bolton-le-Sands.
Grice, Joseph Edward Brindley Brighton.
Hall, James .....Leicester.
Heap, Alfred.....Kendal.
Hearne, Robert Moore .....Worksop.
Higgins, Charles Alfred .....Manchester.
Holmes, Fred .....Lincoln.
Hucklebridge, Wilfred .....London.
Jennings, John Atkinson .....Natland.
Jones, Thomas .....Swansea.
McKenzie, James .....Perth.
Morris, Henry Charles .....Tamworth.
Mundy, Alfred Jones .....London.
Penny, John .. ..Workington.
Poustie, James Henderson.....Alva.
Stewart, Thomas Henry.....Penzance.
Strick, John Richards.....Penzance.
Taubman, Frank Mowbray ...London.
Watt, James.....Haverfordwest.
Wilkinson, Charles Edward ...Bridgnorth.
Wood, William.....Scotswood-on-Tyne.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

ADDITIONS TO THE REGISTER.

The Registrar reported that—

George Spurr, 24, Lincoln Lane, Boston, Lincs, and Robert Munro, Jane Villa, Dunoon, N.B.,

having made statutory declarations that they were in business before the passing of the Pharmacy Act, 1868, and these declarations having been duly supported, their names had been placed on the Register.

NOMINATIONS FOR COUNCIL.

The Secretary reported that he had received *twenty-six* nominations to fill the fourteen vacant seats on the Council, and the following *nineteen* had declared their willingness to accept office if elected :—

Atkins, Samuel Ralph, Market Place, Salisbury.
Baildon, Henry Bellyse, 73, Princes Street, Edinburgh.
Butt, Edward Northway, 13, Curzon Street, London, W.
Carteighe, Michael, 180, New Bond Street, London, W.
Cross, William Gowen, Mardol, Shrewsbury.
Evans, Gwilym, 7, Stepney Street, Llanelly.
Hampson, Robert, 205, St. John Street Road, London, E.C.
Harrison, John, 33, Bridge Street, Sunderland.
Hills, Walter, 225, Oxford Street, London, W.
Martin, Nicholas Henry, 29, Mosley Street, Newcastle.
Neve, Francis Charles, 28, Norman Road West, St. Leonards.
Newsholme, G. T. Wilkinson, 74, Market Place, Sheffield.
Richardson, John G. F., Elmfield, Knighton, Leicester.
Robbins, John, 147, Oxford Street, London, W.
Savage, William Dawson, 23, Freshfield Road, Brighton.
Southall, Alfred, 17, Bull Street, Birmingham.
Symes, Charles, 14, Hardman Street, Liverpool.
Watt, James, High Street, Haddington.
Williams, John, 16, Cross Street, Hatton Garden, London, E.C.

The following *seven* nominees had declined to accept office if elected :—

Borland, John, 7, King Street, Kilmarnock.
Clark, Walter Beales, 15, Belvoir Street, Leicester.
Dymond, Thomas Southall, Sheltwood, Bycullah Park, Enfield.
Haydon, William Frederic, 23, Burlington Chambers, New Street, Birmingham.
Millhouse, Henry How, Heckington, Lincolnshire.
Winfrey, Richard, Long Sutton, Lincolnshire.
Young, James Robertson, 17, North Bridge, Edinburgh.

NOMINATION OF AUDITORS.

The Secretary also reported that he had received *five* nominations to fill the office of Auditor, and that all the nominees had declared their willingness to accept office if elected :—

Hodgkinson, William, 198, Upper Whitecross Street, London, E.C.
Hopkin, William King, 16, Cross Street, Hatton Garden, London, E.C.
Lescher, Frank Harwood, 60, Bartholomew Close, London, E.C.
Stacey, Samuel Lloyd, 300, High Holborn, London W.C.
Watts, William Manning, 32, Lower Whitecross Street, London, E.C.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee was received and adopted on the motion of the President, and various accounts were authorized to be paid ; including £750 on account of the new buildings, and a further amount of £1000 if required before the next meeting of the Council.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants :—

£10 to the widow (aged 28) of an associate and member, having two young children and her mother dependent on her. (Dublin.)

£10 to the widow of a registered chemist and druggist (aged 61), out of health and unable to obtain employment. (This case was referred back to the Committee last month). (Sussex.)

£15 to the widow (aged 71) of a member from 1841 to 1885, and an annuitant from 1885 to his death, which has recently occurred. (Kent.)

£10 to the widow (aged 59) of a registered chemist and druggist. Applicant had a similar grant last April. (Middlesex.)

£5 to a former member from 1844 to 1872 (aged 70). Applicant has been in business thirty-seven years, but is now without resources. (Sussex.)

£5 to a registered chemist and druggist (aged 62). In business for twenty-six years, but had to give it up last August; has no friends and suffers from deafness. (Derbyshire.)

£10 to the widow (aged 40) of a member from 1870 to 1879. Applicant's husband who had been in business thirty years died suddenly in February, leaving six children dependent on her. (Yorks.)

£10 to a former member (aged 57) out of employment from severe illness, from which he is just recovering (Middlesex.)

£10 to the widow of a registered chemist and druggist (aged 79). Applicant had a similar grant last year. (Wilts.)

£5 to a registered chemist and druggist (aged 62). Applicant has had two previous grants of £10. Has four children, none of whom are able to help him. (Middlesex.)

£5 to the widow (aged 63) of a registered chemist and druggist, who has had seven previous grants. (Middlesex.)

The VICE-PRESIDENT, in moving the adoption of the report and recommendation of the Committee, said the list of applicants was longer than usual, but every case had been very carefully considered, and he had no doubt the Council would gladly sanction the grants.

The Council went into committee to consider a special case of distress which one of the members wished to bring forward.

On resuming, the report and recommendations of the Committee were unanimously agreed to, with the addition of a grant of £25 to the Secretary's Casual Fund.

BENEVOLENT FUND DINNER.

The Committee appointed to make arrangements for this dinner recommended that it be held on the evening of Tuesday, May 17, at Freemasons' Tavern, and that the price of tickets should be one guinea. Also, that a circular be issued to all members, associates in business and subscribers to the Fund, inviting them to become Stewards.

The PRESIDENT, in moving the adoption of the report, expressed the hope that, notwithstanding various adverse circumstances, a good many subscriptions would be sent in in time to announce on the occasion of this dinner.

The report was unanimously adopted.

LIBRARY, MUSEUM, LABORATORY AND HOUSE COMMITTEE.

Library.

The report of the Librarian had been received, including the following particulars :—

	Attendance.	Total.	Highest.	Lowest.	Average.
February	Day . . .	485	28	14	20
	Evening .	166	18	4	8

Circulation of books.	Town.	Country.	Total.	Carriage paid.
February . .	136	165	301	£2 3 9

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

To the Library in London—

School of Pharmacy Students' Association, Papers read session 1885–6. From the ASSOCIATION.

Woodward (C. J.), Arithmetical Physics, 2nd ed., 1886, parts 1A and 2A. From the AUTHOR.

Life and Works of Thomas Graham, by R. Angus Smith, edited by J. J. Coleman, 1884. From the EDITOR.

Monmoine (P.), Dosage Volumétrique par les Solutions Limites, 1887.

Mège (P.), La bière, altérations et falsifications, 1887.

Gautrand (T.), Éthérification de l'Acide Sulfurique dans l'Eau de Rabel, 1887. From Professor SOUBEIRAN.

Griffiths, Materia Medica and Pharmacy, 3rd ed., by A. S. Gubb, 1887. From Messrs. BAILLIÈRE, TINDALL and COX (Publishers).

Royal Society of New South Wales, Journal and Proceedings for 1885, vol. 19. From the SOCIETY.

Pharmaceutical Society of Ireland, Calendar, 1887. From the SOCIETY.

Victoria, Pharmaceutical Register for 1886. From the PHARMACY BOARD.

Geological and Natural History Survey of Canada, Annual Report, 1885, new series, vol. 1, and maps. From the SURVEY.

University College, London, Catalogue of the Medical and Biological Libraries, 1887. From the COLLEGE.

To the Library in Edinburgh—

Victoria, Pharmaceutical Register for 1886. From the PHARMACY BOARD.

Chicago College of Pharmacy, 23rd announcement, 1887 From the COLLEGE.

Scientific News, no. 1. From the PUBLISHERS.

The Committee recommended the purchase of the undermentioned works :—

For the Library in London—

Bentley, Manual of Botany, 5th ed., 1887.

Ayrton, Practical Electricity, 1887.

Shore, Elementary Practical Biology, Vegetable 1887.

For the Library in Edinburgh—

Bentley, Manual of Botany, 5th ed.

Tuson, Veterinary Pharmacopœia, 4th ed.

Museum.

The Curator's report had been received, and included the following particulars :—

	Attendance.	Total.	Highest.	Lowest.	Average.
February	Morning .	467	31	4	19
	Evening .	89	14	1	3

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

Twelve slides of microscopic objects. From Mr. C. B. ALLEN.

Specimens of *Catha edulis* and of coffee seed husks. From Mr. J. REDHOUSE.

Specimens of the stem of *Bidara laut.* From Professor VAN EEDEN, Haarlem.

Specimen of the pod of *Strophanthus hispidus.* From Dr. EASMON, Gold Coast.

Specimens of the stems, leaves and roots of *Strychnos Ignatii*, of the stem and root of *Gelsemium elegans*, of the bark of *Evodia glauca*, and of a species of *Paramcria.* From Mr. W. E CROW, Hong Kong.

Specimen of the young stems of *Humirium floribundum.* From Professor J. E. BOMMER, Brussels.

The following donations to the Museum of the North British Branch of the Society had been reported by the Assistant-Secretary, Mr. J. Rutherford Hill :—

Specimen of Strophanthus follicles. From Messrs. BURROUGHS, WELLCOME AND CO., London.

Specimen of Strophanthus follicles. From Professor T. R. FRASER, Edinburgh University.

Specimens of Adulterated Serpentary rhizome, and Adulterated Squill root. From Mr. C. A. MACPHERSON, Edinburgh.

A piece of Lead weighing 6¼ oz. found in a ball of Opium. From Messrs. T. and H. SMITH AND CO., Edinburgh.

The Professors had attended and reported on their respective classes.

The Committee had considered what steps it was desirable to take in reference to the letter from Sir F. Abel respecting the establishment of the Imperial Institute, and had recommended that a circular letter be sent to each member and associate in business of the Society.

The PRESIDENT in moving the adoption of the report, said there was nothing he need specially call attention to. The members had all probably seen the circular

referred to, in response to which he had already received certain sums amounting to about £120, which had been sent on to the Secretary of the Imperial Institute, and duly acknowledged in the daily papers.

The motion was unanimously agreed to.

BUILDING COMMITTEE.

This Committee had had a conference with the Solicitor and Surveyor on business connected with the new building. It was recommended that a porch be built at the Pied Bull Yard entrance if the permission of the Vestry could be obtained.

It was also recommended that the contractors be paid £750 on account on the certificate of the architect, and a further sum not exceeding £1000 in the course of next month, also on the architect's certificate.

The Council went into Committee to discuss the details of this report.

On resuming, the report was unanimously agreed to.

LAW AND PARLIAMENTARY.

At the meeting of this Committee the President had reported the steps he had taken to secure the entire exemption of chemists and druggists from the provisions of the Early Closing Bill, and his interview with Sir John Lubbock on the subject. He had also reported on the progress of the Pharmacy Acts Amendment Bill.

The Committee had considered a Medical Registration Ordinance of St. Vincent (1886), sent by order of the Secretary of State for the Colonies, for any observations on the provisions relating to druggists. The Committee had approved its general provisions with certain additions to the Poison Schedule which it considered desirable.

The Council went into Committee to consider this report. On resuming—

The PRESIDENT moved the adoption of the report. In reference to the St. Vincent Ordinance which had been sent to the Council for consideration, he might say that the Committee found it very satisfactory, much more so than the British Act; it was both a Poison Act and a Pharmacy Act, and the only defects appeared to be the omission from the schedule of poisons of those preparations which had been added on the suggestion of the Council since the Act of 1868 was passed, and which had probably not come under the notice of the draftsmen. The Committee recommended that these additions should be made, and from previous experience he had no doubt this would be done. The Council had been consulted on most Colonial Acts passed of late years on such matters, and in each case the Secretary of State accepted the suggestions before authorizing the proposed Act.

The report was unanimously agreed to.

GENERAL PURPOSES.

The report of this Committee included reports from the Professors on the examinations at the end of the first five months' course.

Botany and Materia Medica.

Professor Bentley had reported very favourably of this class with regard to regularity of attendance and general good conduct. Fifteen candidates had presented themselves, the first five of whom he considered worthy of a medal and certificates respectively.

Chemistry and Physics.

Professor Dunstan had reported that there were eight competitors in this class, and he had every reason to be satisfied with the answers given.

Acting on the above reports the Committee recommended the following awards :—

Botany and Materia Medica.

Bronze Medal		Edmund White.
Certificates of Merit	Equal	John Thomas.
		Edward James Woolley.
		Ernest Daintree.
		Weston Poole.

Chemistry and Physics.

Bronze Medal		Edmund White.
Certificates of Merit	Equal	John Thomas.
		Weston Poole.
		Ernest Daintree.
		Edward James Woolley.

The usual letter from the Solicitor was also included, stating the steps being taken in connection with various cases of alleged infringement of the Pharmacy Act.

T. W. Dyball, 27, St. Nicholas Street, Ipswich, had confessed judgment for a penalty prior to the day named for the hearing of the action against him for infringement of the provisions of the Pharmacy Act, 1868.

Several other cases had been considered by the Committee, and in four a prosecution was recommended.

Honorary Members.

After full consideration of the names entered in the book kept for the purpose, the Committee had decided to recommend a list of gentlemen for election in May next.

The Council, as usual, went into committee to consider the legal portion of this report.

On resuming, the report and recommendations were carried by a large majority, and a special resolution was also passed making the prize awards.

THE REDWOOD TESTIMONIAL.

The PRESIDENT reported that at a meeting of the Redwood Testimonial Committee it had been resolved that a legal trust deed should be drawn up, and that a sum of about £600 should be invested in Great India Peninsular Railway Stock, so as to produce an annual sum for a Redwood Scholarship. The instructions he was authorized to give the Solicitor with regard to the deed were that the Council of the Society for the time being should have charge of this capital sum, and should award it under such conditions as it thought fit; the examination to be in any or all of the subjects which now regulated the Bell Scholarships, or in any additional subjects, and that the Council should have power to alter the investment as it thought desirable. A deed had been prepared accordingly, and it would be necessary that the seal of the Society should be affixed to it.

Mr. SCHACHT said he supposed the exact conditions of the examination had not yet been settled.

The PRESIDENT said No; not yet.

Mr. WILLIAMS said the Library Committee would probably draw up a scheme, but it could not come into operation for some time.

Mr. SCHACHT hoped the proposed deed would not bind the Council too strictly.

The PRESIDENT said it left a very wide discretion to the Council. The name of the Scholarship, of course, could not be changed, but subject to that there was great latitude. The deed recited the meetings which had been held, gave the names of the whole of the Committee, and set out the resolutions which had been passed at its meetings: that about £600 should be invested to form a Redwood Scholarship, to be held in connection with the School of Pharmacy of the Pharmaceutical Society, the surplus to be expended in painting a portrait of Professor Redwood to be placed in the house of the Society.

Mr. GREENISH asked if £600 was enough to found a scholarship.

The PRESIDENT said it would produce about £20 to £24 a year; but the Council had no power to deal with that, it was the decision of the Testimonial Committee. He then read the principal portions of the deed.

Mr. BOTTLE asked in whose hands the property in the portrait would be vested.

The PRESIDENT said he apprehended when the Committee handed over the portrait it would be vested in the Society.

Mr. BOTTLE thought that ought to be expressed in the deed.

The PRESIDENT said that was not necessary; it would

not have been mentioned in the deed at all, but for the fact of its appearing in the resolution. He should be instructed in due time by the Committee to hand over the portrait to the Society under conditions which would be named; there would be no trust relating to the portrait. The Committee had already drawn up an inscription to be placed on a tablet which would be handed over with the picture, on which would appear something to the effect that the portrait was presented to the Society by the friends and former pupils of Professor Redwood.

Mr. ATKINS thought the picture would have been given to the Professor himself or his family, who would then hand it back to the Society for custodianship.

The PRESIDENT said the portrait was being painted by a distinguished artist, Mr. Hodges, and arrangements had been made for handing a replica of it to Professor Redwood as a personal gift.

Mr. WILLIAMS, as treasurer of the fund, said the only matter of regret was that the amount subscribed was not larger; but they must take it as it stood, and trust it would be of use to scholars in the future, and act as a stimulus to their education, whilst at the same time doing honour to the name of Professor Redwood.

A resolution for affixing the seal of the Society to the deed was then passed unanimously.

DR. GREENHOW'S REPORTS FOR 1885 AND 1886.

The Secretary laid on the table copies of the following Reports which he had recently received from the Privy Council Office:—

"*Report on the Examinations held by the London Board of Examiners of the Pharmaceutical Society during the year* 1885.

"These examinations were conducted in the usual manner during last year and there was nothing unusual either in their management or results that requires special comment.

"*First or Preliminary Examination.*—This examination was conducted as in former years by the College of Preceptors.

"A total number of 1278 candidates were examined, 690 of whom passed and 588, or 46·0 per cent., were rejected. The proportion of rejections was therefore rather less than usual.

"For the purpose of comparison with former years I append a table showing the proportion of rejections for each 100 candidates in each of the five years previous to 1885, and also the average rate for the whole of that period.

"*First or Preliminary Examination.*

	1880	1881	1882	1883	1884	Average for five years.
Number of rejections per 100 candidates ..	48·0	56·8	50·4	49·9	51·6	51·2

"Of the rejected candidates last year 20 failed on account of general weakness in the whole examination, although they had gained the minimum passing number of marks in each separate subject; 87 failed in all the subjects, namely English, Latin and Arithmetic; 209 in Arithmetic; 39 in Latin; 45 in English; and 186 in two of these subjects.

"Arithmetic continues to be the subject in which the candidates show the greatest weakness, for if the number of those who failed in it in conjunction with one or both the other subjects be added to the 209, the number that failed in Arithmetic is raised to 476. The total number of those who failed in Latin was 252, and in English 240.

"The Board of Examiners held 28 meetings during the year for conducting the technical examinations, at 13 which I was present.

"*Major Examination.*—During last year 87 candidates presented themselves for this examination, 47 of whom passed, and were registered as pharmaceutical chemists and 40, or 46·0 per cent., were rejected.

"The subjoined table shows the proportion of failures per 100 candidates, in this and the Minor examination, in each of the five years preceding 1885, and also the average proportion for the entire period:—

	1880	1881	1882	1883	1884	Average for five years.
Major examination....	54·3	49·0	61·7	50·0	48·1	52·6
Minor examination ..	54·6	50·6	57·7	62·8	66·0	58·3

"As regards the Major examination the number of candidates examined was too small to admit of any very certain conclusion being drawn from the diminished proportion of rejections last year. It is nevertheless satisfactory to observe that the proportion of failures has been smaller in each of the last two years.

"It is significant that 13 candidates failed last year because of general weakness in all the subjects, although they had obtained the minimum passing number of marks in each separate subject; 13 also failed in practical work; 5 failed in Chemistry (*vivâ voce*); 5 in Materia Medica, and 4 in Botany.

"*Minor Examination.*—During last year 744 candidates were examined for the Minor qualification, only 255 of whom passed and were registered as chemists and druggists, and 489, or 65·7 per cent., failed. It will be seen on reference to the table given in the last paragraph that the proportion of rejections has increased largely since 1881, until at length nearly two-thirds of the candidates have been rejected in each of the last two years.

"There have been an unusual number of changes in the constitution of the Board of Examiners in the last two years, a circumstance which, taken in conjunction with the increased number of rejected candidates, led me to watch the examinations very closely last year, with the view of discovering whether greater strictness on the part of some of the examiners might not in some degree account for the larger proportion of rejections; but I am bound to say that I was unable to find any ground for attributing the result to any other cause than the incompetency of the candidates.

"Of the rejected candidates last year 81 failed on account of general weakness in all the subjects; 171 failed in Practical Dispensing; 70 in Chemistry; 64 in Pharmacy; 43 in Reading Prescriptions; 22 in Materia Medica; 27 in Botany, and 11 in two or more of these subjects.

"I have in former reports expressed my opinion that the unsatisfactory results of these examinations are chiefly owing to the very imperfect early education of the candidates, and the want of sufficient practical training in the art of compounding medicines and dispensing prescriptions. Nevertheless, notwithstanding the large number who are found to be incompetent, I am of opinion that the examinations are conducted with care and due consideration for the candidates; and that those who pass are really qualified for their calling and may be safely placed on the Register of Chemists and Druggists.

(Signed) "E. HEADLAM GREENHOW."

"*Report on the Examinations held by the London Board of Examiners of the Pharmaceutical Society during the year* 1886.

"The first or Preliminary examination in English, Latin, and Arithmetic, was conducted, as usual, by the College of Preceptors; the number of candidates examined was 1305, of whom 632 passed and 673, or 51·57 per cent., were rejected.

"The proportion of rejections was therefore rather above the average of the six preceding years. I have seen the examination papers and consider them as fair

and not more difficult than was necessary in order to test the elementary education of the candidates in relation to their future calling as dispensers of medical prescriptions.

"The rejections were caused in 26 cases by failure to obtain the aggregate number of marks required for passing the whole examination; that is to say, these candidates were so weak that, although each of them had earned four-tenths of the number of marks allotted to each separate subject, he had failed to obtain an aggregate of half the number of marks on the whole examination.

"The regulation under which these persons were rejected appears fair and reasonable, and is intended to meet the case of any candidate who may be very well up in two of the subjects though rather weak in the third, and yet it excludes such as are weak in more than one subject.

"Of the remainder 138 failed in all the subjects; 238 in Arithmetic; 37 in Latin; 38 in English; and 201 in two subjects.

"As I have remarked in former reports, the candidates are weaker in Arithmetic than in either of the other subjects, for adding the 238 who failed in this subject to 323 who failed in Arithmetic and also in either one or both the other subjects, we have a total of 561 candidates who were rejected for Arithmetic. Competency in Arithmetic is necessary, not only as a test of a fair elementary education, but is also absolutely requisite in practice, for in dispensing it is frequently necessary to calculate fractional parts of the more active ingredients of a prescription.

"In like manner, an acquaintance with Latin is required for reading and dispensing prescriptions written in that language; and, as a proof that the standard of examination in Latin is not too high, I may mention that last year 57 candidates, who had passed the Preliminary examination in Latin, failed in translating prescriptions at the final examination for the Minor qualification.

"The large proportion of rejections, from year to year, in the Preliminary examination, seems to render it most desirable that it should be passed previous to the commencement of the technical education.

"According to the present regulations, a young man may pass this examination at any time before presenting himself for the Minor or qualifying examination. Hence, it not unfrequently happens that the time which should have been devoted to learning the practical part of the business, and preparing for the technical examination, is taken up with studying for the Preliminary examination. The education acquired in this way is, in most cases, very imperfect, as is manifest from the large number of candidates who failed in so elementary a subject as Arithmetic. Many of the rejected candidates must eventually turn to some other occupation, after wasting two or three of the most precious years of life in endeavouring to obtain admission into a calling for which they are entirely unsuited. And, even of those who struggle through the Preliminary examination, many probably fail at the Minor examination, by reason of having given up the time during which they should have been occupied with technical training, to the endeavour to remedy the deficiencies of their early education. It is not at all rare for candidates to present themselves unsuccessfully four or five or six times, or even oftener, for the Minor examination.

"It would obviously, therefore, be much better that such imperfectly educated men should ascertain their incompetence at an early period of life and thus be set free to look out, ere it is too late, for an occupation better suited to their capacity.

"The Board of Examiners met on thirty days during last year for the examination of candidates in the technical subjects.

"*Major Examination.*—During last year 90 candidates were examined for the Major qualification, 51 of whom passed, and were registered as pharmaceutical chemists, and 39, or 43·3 per cent. were rejected.

"This is a large proportion of rejections considering that these candidates had already passed the Minor examination, and, being registered as chemists and druggists, were qualified under the Pharmacy Act 'to keep open shop for retailing, dispensing, or compounding of poisons.' It is nevertheless, satisfactory, that the smaller proportion of rejections in this examination, referred to in my report for 1885, is maintained, and that there has been a small decrease in each successive year since 1882. No change having been made either in the mode of conducting or in the strictness of the examination, it follows that the candidates have been better prepared.

"Of the candidates who failed to pass, 14 were rejected on account of general incompetence, and 16 in either Chemistry or practical work.

"*Minor Examination.*—The number of persons examined last year for the Minor qualification was 824, of whom 304 passed, and 530, or 63·1 per cent. were rejected.

"As I have said on former occasions, I cannot attribute this large proportion of rejections to any other cause than the unpreparedness of the candidates, and more particularly to their deficiency in practical knowledge and skill.

"Thus 205 candidates failed in Practical Dispensing, either alone or in conjunction with some other subject; 71 in Chemistry; and 57 in Reading Prescriptions, the three most important subjects, in each of which the examination is thoroughly practical.

"The number of rejections on the other subjects were 56 on account of general weakness, that is to say failure to earn the minimum passing number of marks on the whole examination; 82 in Pharmacy; 34 in Materia Medica; and 25 in Botany.

"My first duty in connection with these examinations is to report annually to the Privy Council as to their efficiency, as a qualifying test for registration under the Pharmacy Act, and their fairness towards the candidates. It is very satisfactory that I have always hitherto been able to report favourably in both these respects.

"The examinations are conducted with fairness and impartiality, and the successful candidates are fully entitled to their certificate of qualification to carry on business as chemists and druggists. It has, however, also been my desire and aim to co-operate with the Board of Examiners in improving the mode of conducting the examinations, with a view to increasing their practical efficiency; with this intention I have, from time to time, made various suggestions, which have always been courteously received and generally adopted. The Society has recently obtained additional space, and is about to erect new rooms, better adapted for the purpose of examination than those now in use.

"Considering the large number of candidates who are rejected for Practical Dispensing, I have thought it well to recommend that this part of the examination should be extended both as regards scope and duration. At present each candidate is required to dispense two articles from a written prescription, under the surveillance of the Examiner, who commonly has four candidates under observation at once.

"I think it would be fair to the candidates and it certainly would not lessen the value of the examination as a practical test of competency, if each candidate were required to dispense a larger number and greater variety of articles. I have also, for some time, thought that it would be desirable, when practicable, to extend the present examination in Pharmacy, which is almost entirely *vivâ voce*, by requiring each candidate to prepare some one or more of the officinal compounds ordered in the British Pharmacopœia.

"These suggestions would, if carried into effect, require an extension of the time now given to the examination, and would involve its division into two parts, to be held

on separate days, as is the case with the Major examination.

"This would, however, be favourable to the candidates by diminishing the pressure of undergoing examination on so many subjects on the same day.

"With these suggestions in view, I requested a conference with the Board of Examiners in April last, and recommended that a practical examination in Pharmacy should be added to the present *vivâ voce* examination in that subject, and that the amount of work done in Practical Dispensing should be increased. The Board at a subsequent meeting referred the subject to a committee of its members for consideration, which reported in favour of adopting both my recommendations.

"The report has been generally approved by the Board of Examiners, which has also unanimously resolved 'That an examination in Practical Pharmacy should be instituted and the amount of work in Practical Dispensing increased, allowing a corresponding increase of time, as soon as additional space is available,' and that 'the examination for the Minor qualification should be divided into two parts extending over two days at an early opportunity.' Certain details will require to be carefully considered and arranged, and, on account of the limited space in the present building, some time must elapse before these resolutions of the Board can be carried into effect. I understand that the new examination rooms will be completed and ready for use at the beginning of October, and hence I trust that the proposed amendments in the mode of conducting the examinations in practical pharmacy and dispensing may be effected early next year.

(Signed) "E. Headlam Greenhow."

Mr. Symes said he supposed it was not competent for the Council to criticize these reports in any way, but he might perhaps be allowed to say that he strongly endorsed one particular paragraph in which Dr. Greenhow said he thought it would be desirable to extend the examination in pharmacy, which was almost entirely *vivâ voce*, by requiring each candidate to prepare some one or more of the officinal compounds of the Pharmacopœia. Seeing that this recommendation had been submitted to the Boards of Examiners, and approved by them, he thought it as well to emphasize this opinion that the examination should be rendered more practical in this direction, and it rather supported the contention which might come forward at some future time, that the Society should teach what the candidates were required to know.

The Secretary read a letter from the Hull Chemists' Association, enclosing a resolution of thanks for the *Pharmaceutical Journal* during the past year.

The Auditors' Report.

The Auditors' Report was presented and laid on the table.

Proceedings of Societies in London.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, March 31. Mr. E. White in the chair.

The following paper was first read:—

Officinal Succi,

by arthur smith,

Bell Scholar.

Several prepared juices have been used in medicine for a considerable time, and of these, five are official in the present Pharmacopœia: succus belladonnæ and succus conii obtained from the leaves and young branches; succus hyoscyami, from the leaves, flowers, and branches; succus scoparii, from the tops; and succus taraxaci, from the root of the respective fresh plants. Succus digitalis, although unofficial, is also included in this paper, as it is frequently employed in medicine. Both the wild and cultivated plants of belladonna and hyoscyamus may be utilized for the preparation of the juices, but in the case of conium the wild plant only is official. These succi are all prepared in the same manner, namely, by crushing in a stone mortar, and, after expression, the addition of one volume of rectified spirit to every three volumes of juice. After standing for seven days, the liquid is filtered from the small amount of mucilaginous matter which has been deposited. This quantity of spirit is found to be sufficient to preserve the juice from decomposition.

Succus limonis and succus mori, being the natural juices of the fruits and not prepared by the addition of spirit, of course are not included with the ordinary succi, and I suppose it is on this account that they are classed separately in the Pharmacopœia.

The object of this paper is an endeavour to ascertain the quality and strength of the various succi, especially as hardly any information can be obtained from our text books and journals, and for this purpose nineteen samples were procured from well-known wholesale houses.

In all vegetable juices the proportion of active principle varies according to the succulency of the plant, and this is, of course, dependent on certain conditions, such as the locality and the amount of rainfall during the few months previous to collection.

Much of the succus conii of commerce is said to be obtained from the leaves and shoots before the flowering stem is developed, but this is far inferior to that yielded at the time prescribed in the Pharmacopœia (which, I need hardly mention, is when the fruit is commencing to form).

The method of procedure was as follows:—The specific gravity of the juice was first obtained, then the amount of rectified spirit was ascertained by diluting a given quantity of the juice with distilled water, and distilling, by means of a revenue still, into a specific gravity bottle. The specific gravity of the distillate thus obtained showed, on reference to Fownes's table, the amount by weight of real alcohol in the dilute spirit, and from this the amount, by volume, of rectified spirit in the original succus was ascertained by calculation. Another quantity of succus was now taken for the estimation of alkaloid; and, lastly, a small volume was evaporated by means of a water-bath until the residue ceased to lose weight.

Unfortunately, no standard samples can be prepared at this season of the year, and, therefore, the real amount of alkaloid which each juice should contain can only be roughly estimated by comparing the results obtained from analyses of commercial samples.

The following tables show the results of these experiments:—

Succus Belladonnæ.

No. of sample.	Specific gravity.	Amount in grams of alkaloid in 100 c.c.	Volume of S.V.R. in 100 c.c.	Dry residue grams in 100 c c.
1 . .	·9950	trace	23·860	2·360
2 . .	·9865	·05	24·157	2·665
3 . .	·9915	·0325	24·585	3·285

For the estimation of alkaloids 30 cubic centimetres of the succus were evaporated to a small bulk over a water-bath, mixed with more spirit to separate albuminous matter, filtered, and again evaporated to drive off the whole of the spirit; the residue was slightly diluted with distilled water, and rendered alkaline with solution of ammonia. After allowing excess of ammonia to evaporate, the liquid was well shaken with chloroform in a stoppered separator. When the chloroform had separated it was shaken with a little distilled water to dissolve out

any ammoniacal salt it may have contained, and on evaporation left the alkaloid in a practically pure state.

No. 1 (*a*), treated thus, failed to yield any alkaloid. Ten c.c. were therefore evaporated to drive off the spirit, the residue dissolved in water acidulated with sulphuric acid and solution of potassio-mercuric iodide added, which also failed to produce a precipitate. Two minims of the juice dropped into the eye did not cause any dilatation of the pupil. Five c.c. left, on evaporation over a water-bath, ·118 gram. In order to fully establish the above results, another sample of this juice was obtained from the same house with the following results:—

No. 1 (*b*). The clear chloroformic solution obtained as before left on evaporation a very thin film of a pale yellow colour, which on mixing with a little acidulated water gave only a very faint turbidity with solution of potassio-mercuric iodide. Ten c.c. after dissipation of the spirit also gave no precipitate with this reagent. Three minims dropped into the eye caused the pupil to dilate very slightly, causing a very irritating sensation, doubtless on account of the spirit which it contained. From these results it is quite evident that this sample contained only a trace of atropine. The determinations of the specific gravity, amount of spirit and of dry residue fully confirmed those of No. 1 (*a*).

No. 2. This sample yielded a very fair proportion of atropine. It contained a little more spirit than No. 1, and consequently had a lower specific gravity. Thirty c.c. gave on agitation with chloroform, by the process described above, ·015 gram, corresponding to ·05 gram in 100 c.c. This alkaloid formed a clear solution with acidulated water and gave an abundant precipitate with solution of potassio-mercuric iodide.

In order to check this, 10 c.c. of the succus were evaporated, the residue dissolved in a little acidulated water, and the alkaloid estimated gravimetrically with solution of potassio-mercuric iodide (1 in 200). The precipitate obtained in this manner contains 40·9 per cent. of atropine and has the formula $(C_{17}H_{24}NO_3I)_2 + HgI_2$ (Dragendorff). The precipitate in this case weighed, after drying, ·0155 equal to ·155 gram in 100 c.c. This is equal to ·063395 gram of atropine, thus giving a larger percentage than that obtained with chloroform. Atropine and hyoscyamine cannot be satisfactorily estimated by the drop test. It is noticeable that this sample, which gave the largest yield of alkaloid, had a paler colour and a decidedly weaker and more pleasant odour than the others.

No. 3. This sample contained more extractive matter than either of the others. The amount of alkaloid obtained by agitation with chloroform was considerably less than in the preceding specimen, being only ·0325 gram in 100 c.c.

All the samples of belladonna were of a clear reddish-brown colour. No. 1 had a strong unpleasant odour, No. 2 similar but somewhat weaker. Wild belladonna has been found to contain most alkaloid.

Succus Conii.

No. of sample.	Specific gravity.	Amount in grams of alkaloid in 100 c.c. as chloride.	Volume of S.V.R. in 100 c.c.	Residue from 100 c.c.
1 . .	·9878	·284	28·789	3·440
2 . .	·9915	·100	25·122	3 580
3 . .	·9935	·088	23 633	4 600

The assay was conducted as follows:—25 c.c. were evaporated to drive off the spirit, the residue slightly diluted and put into a separator with some petroleum ether, a little solution of carbonate of potassium added, and the mixture thoroughly well shaken together, and allowed to separate completely. The petroleum ether (containing the liberated alkaloid) was now shaken with dilute hydrochloric acid, which dissolved out the alkaloid and was allowed to separate completely; the ether was again shaken with the alkaline liquid, and after separation returned once more, with the same precautions, to the acid solution. This mixture was well shaken and after separation removed from the ether, and evaporated over a water-bath at a gentle heat. By this process No. 1 gave a very good proportion of a white crystalline salt, chloride of the alkaloid. Coniine being a liquid alkaloid volatile at the ordinary temperatures cannot be accurately estimated as such. Nos. 2 and 3 yielded less than half the amount obtained from No. 1. Samples 1 and 2 were dark reddish-brown; No. 3 was much lighter in colour, resembling succus hyoscyami. The odour of No. 2 was more powerful than either of the others. Dragendorff states that the chloride is volatile at the ordinary temperatures, but as this statement is contradicted by others, this method was accepted as the most trustworthy. An attempt was made to estimate succus conii with Mayer's reagent, but the results obtained were very unsatisfactory.

Succus Digitalis.

No. of sample.	Specific gravity.	Amount in grams of glucoside in 100 c.c.	Volume of S.V R. in 100 c.c.	Residue from 100 c.c.
1 . .	·9808	·1	28 686	2·50
2 . .	·9906	·055	25·053	2·76
3 . .	·9908	·075	26·663	4·00

The juice was evaporated, and the residue exhausted with water acidulated with acetic acid, which leaves some extractive matter behind. To the solution ammonia is added until nearly neutral, and then the glucoside is precipitated with solution of tannic acid. The precipitate is well washed with hot water, after which it is well rubbed and heated with litharge and spirit. The digitalin is set free, and dissolved by the spirit.

The digitalin obtained in this manner formed a clear solution with acidulated water, and gave a flocculent precipitate with solution of tannic acid.

Succus Hyoscyami.

No. of sample.	Specific gravity.	Amount in grams of alkaloid in 100 c c.	Volume of S.V.R. in 100 c.c.	Residue from 100 c.c.
1 . .	·9811	·0166	28·404	4·66
2 . .	·9892	·0233	23·533	2·69
3 . .	·9844	·02166	27·469	3·52

The colour of these was that of a bright sherry. Nos. 1 and 2 had a somewhat faint odour, but that of No. 3 was much stronger, and its taste more unpleasant.

Hyoscyamine being identical in composition with atropine the juice was estimated by the same process, and yielded results which were far more constant. It will be noticed that the first specimen contained more than 3 per cent. more spirit than is required by the Pharmacopœia, although 25 per cent. is said to be sufficient to prevent decomposition if kept in a cool place. The amount of solid residue varied from 2·6 to 4·6 grams in 100 c.c.

Succus Scoparii.

No. of sample.	Specific gravity.	Amount in grams of alkaloid in 100 c.c.	Volume of S.V R. in 100 c c.	Residue from 100 c.c.
1 . .	·9833	·0375	28·327	2·13
2 . .	·9859	·075	26·321	2·19
3 . .	·9932	·1530	25·220	4·55

Scoparium contains a liquid volatile alkaloid termed sparteine, and a bitter principle, scoparin.

In the absence of any definite authority as to which of these two substances the juice owes its activity, the alkaloid sparteine was alone isolated. Scoparin is said to be a yellowish powder. There is no recognized method of obtaining it; it is peculiar to note that No. 2 contained just twice as much alkaloid as No. 1, and No. 3 about twice as much as No. 2, so that the third sample was four times the strength of the first.

Each specimen had a fragrant, slightly aromatic odour, but rather unpleasant taste.

Nos. 1 and 2 were of a pale sherry colour, but No. 3 was dark reddish-brown, indistinguishable in appearance from succus belladonnæ, and was, in all respects, a very fine sample, as shown by the results tabulated above.

For the alkaloidal estimation 40 c.c. were evaporated on a water-bath to remove the whole of the alcohol, the residue dissolved in solution of tartaric acid, the solution filtered and made alkaline with carbonate of potassium and then shaken with ether. By this method ·015 gram was obtained from the 40 c.c., corresponding to ·0375 gram in 100 c.c. This was dissolved in distilled water, acidulated with sulphuric acid, and solution of potassio-mercuric iodide added, which gave a beautiful yellow precipitate. This precipitate was then suspended in acidulated water, and decomposed by passing a current of sulphuretted hydrogen gas through the liquid. The black precipitate of sulphide of mercury having been filtered out, the alkaloid was re-precipitated by solution of carbonate of potassium and again shaken with ether, leaving after evaporation of the ether, ·012 gram corresponding to ·03 gram in 100 c.c., thus proving, after allowing for slight loss during the process, that the residue obtained in the first place consisted of pure alkaloid.

When the solution of tartaric acid was added to the residue of the succus after the evaporation of the spirit during the above process, a considerable quantity of a crystalline salt was thrown down, which was at first thought to consist of tartrate of calcium, but on further examination proved to be acid tartrate of potassium.

Succus Taraxaci.

No. of sample.	Specific gravity.	Amount of S.V.R. by volume in 100 c.c.	Relative bitterness.	Residue in 100 c.c.
1 . .	·9847	27·844	78	3·61
2 . .	·9889	28·855	91	5·86
3 . .	1·0136	24·903	100	10·01

No. 1 had a pale sherry colour, No. 2 dark sherry, and No. 3 deep reddish-brown. As these gave corresponding amounts of solid residue on evaporation over a water-bath, the colour in succus taraxaci appears to be a good test as to the amount of extractive matter present. No. 3 gave 10 per cent. of solid residue and therefore possessed a much greater density than any other juice.

As there is no practicable method of isolating taraxacine, one must judge the quality of these preparations by means of their flavour, appearance, density, and amount of residue left after evaporation, taste being the most reliable test.

The relative amount of bitterness was judged by noting the amount of water required to dilute the stronger juices until each appeared to the palate to possess the same amount of bitterness, the figure 100 being taken for convenience to represent the juice possessing the largest amount of bitterness.

Succus taraxaci is a great improvement upon the succus of the same name in the last Pharmacopœia, which allowed too wide a limit in the time of collection. It is stated to possess the largest amount of bitterness when prepared in the month of January, but it is frequently almost impossible to dig up the root then on account of the hardness of the ground.

The reason of the discrepancy that occurs in the quality of this excellent preparation of dandelion is explained when one thinks of the different localities in which the root is collected, and the different ways of growing it.

According to Mr. Smith (Edinburgh) who gave a very interesting account of his experiences in the preparation of this well-known medicine before the Pharmaceutical Conference a few years ago, the plant gave very gratifying results when cultivated. He stated, if I may be permitted to repeat a few of his remarks, "On one occasion we got a most remarkable result. The bitter principle was intense like aloes, and the root was collected immediately after flowering. The weather happened to be particularly calm, and the whole field was several inches deep with the most lovely snow-white carpet which could be conceived."

In conclusion, I would like to remark that the results of the examination of the several juices, as shown in the above tables, show the great desirability, if not the absolute necessity, of endeavouring to obtain greater uniformity in the strength of these preparations. As pharmacists we like to know what we are handling, but the first sample of succus belladonnæ, a juice which is usually labelled "poison" and is prescribed in small doses, shows the uselessness of that sample for all medicinal purposes. A great advance has been made by standardizing many of the official preparations, and it is to be hoped that soon some means will be devised of obtaining, as far as possible, uniformity in the strength of these juices; doubtless they would be far more valuable if the cultivated plants alone were official for their production. If uniformity of strength could be depended upon, they would be frequently prescribed instead of the extracts, because there is always considerable danger of injuring many of the alkaloids by the application of any great amount of heat.

The paper was followed by a discussion in which the Chairman, Messrs. Bird, Braithwaite, and the Secretary took part.

Mr. L. W. Hawkins then gave a report on "The Strength of some Official Preparations;" the following being the results obtained:—Six specimens of vinegar were found to contain from 3·86 to 5·64 per cent. of $HC_2H_3O_2$, and from ·023 to ·129 per cent. of H_2SO_4 as sulphates. Four samples of aqua laurocerasi, bought as B.P., contained respectively ·086, ·078, ·102 and ·098 per cent. of HCy. Six specimens of calx sulphurata varied from 31·57 per cent. to 62·33 per cent. of calcium sulphide, the lowest containing free carbon and evidently having been insufficiently heated. Six samples of ferrum redactum contained from 23·61 to 58·18 per cent. of metallic iron, and all contained traces of sulphide (apparently showing that the hydrate from which they were produced was derived from ferric sulphate, instead of ferric chloride as ordered). Six lots of vinum ferri varied in strength from 0·39 to 1·19 grain of metallic iron per fluid ounce.

After a discussion on this report and some miscellaneous business the meeting adjourned.

ROYAL INSTITUTION.

Light as an Analytic Agent.

On Friday, the 1st inst., in a lecture delivered at the Royal Institution upon "The Use of Light as an Analytic Agent," Professor Dewar very ably drew attention to the relation which optical science bears to chemistry, introducing at the same time the results of some researches recently made by Professor Liveing and himself. There are two conditions, he observed, which lend themselves most readily to analytical research by means of light: first, the effect produced when light is transmitted through or reflected from matter; secondly, the condition of matter when emitting light by the agency of either heat or electricity. Another condition is illustrated by

guaiacum, which, as was first shown by Wollaston, when exposed to atmospheric air in a strong light undergoes a change in composition, probably one of oxidation. This action of light was shown by Professor Dewar, who exposed a thin film of refined guaiacum spread over a white surface to a ray of electric light for a period of half a minute, when the gum was found to have acquired a deep greenish blue colour; the composition of the body that undergoes changes of colour in this case is still unknown. As an example of a similar action of light more recently discovered, Professor Dewar showed some experiments with a body of definite chemical composition, "tetramethylparaphenylenediamine." This body is so susceptible to the molecular contact of oxygen in the presence of light, that a solution of sulphate of copper first oxidizes it to a blue colour, and then deoxidizes it, when it assumes a brown colour. Antiseptics such as mercuric chloride also act upon it as oxidizing agents, whilst even the evaporation of ether from its surface in the presence of light has the same effect. With regard to the property possessed by some bodies of emitting light, termed phosphorescence, the lecturer said that two methods might be employed to stimulate these bodies, either by passing an electrical discharge through them whilst in vacuum, or else first exposing them to the action of light and then obtaining suitable conditions of temperature. By the first method, Professor Dewar showed the phosphorescence of several bodies, and drew attention to the fact that although the ruby and alum are of entirely different appearance under ordinary conditions, yet when an electrical discharge is passed through them, both give the red glow of alumina. Of bodies stimulated by exposure to light, sulphide of calcium, which has recently attracted so much notice, forms an excellent example of the influence of temperature upon phosphorescence. Thus, sulphide of calcium stimulated by exposing it to a ray of electric light, and then cooled to a temperature of −80° F., shows no sign of phosphorescence; but upon the temperature being raised, light is emitted from it. This, as Professor Dewar explained, is probably due to a certain amount of potential energy being stored up by exposure to the light, this energy remaining latent except under suitable conditions of temperature. Digressing a few minutes from his subject, Professor Dewar exhibited a curiosity which has been recently forwarded to him by Dr. Koch, of Berlin. This was an example of the phosphorescence of organized matter, being the phosphorescent bacteria of sea-water, cultivated in gelatine, which Dr. Koch during a research on these bacteria has succeeded in separating. In a dark room, these bacteria show a brilliant phosphorescence. The lecturer then drew attention to the spectroscope and the value of spectrum analysis in chemistry. He regarded spectrum analysis as a refined analytical method, by which so great progression had been made in the study of the composition of bodies as to outstrip chemical analysis. Nevertheless, many results are obtained with the spectroscope which are at present misleading, owing to the method of analysis being still imperfectly understood. As an instance of this uncertainty having led to wrong conclusions being drawn, Professor Dewar mentioned that certain lines which had always been regarded as part of the solar spectrum have recently been discovered to be due to the atmospheric air through which the solar rays pass. Some of the discrepancies which arise are very interesting. Thus when an electric discharge is passed through bodies in a gaseous state, it is very frequently accompanied by an alteration of the molecular condition. With oxygen, ozone is formed, which retards some of the yellow and red rays, giving a preponderance of blue rays in the spectrum. If a current of electricity be passed through a tube containing the transparent vapour of phosphorus, a deposit of allotropic or amorphous phosphorus is formed on the side of the tube, imparting a ruddy glow to a ray of white light transmitted through it; but if the current be stopped and the tube strongly heated the phosphorus regains its original transparent gaseous condition. If such changes take place, the question arises as to what bodies may or may not be manufactured during the experiment. Professor Dewar mentioned, incidentally, an observation which he had recently made, and was at loss to account for. He found that if a current of electricity be discharged through tubes containing pure sulphur or phosphorus vapour or hydrogen gas by means of a carbon electrode, the lines identified with carbonic acid gas are always formed in their spectrum. If these lines are, in this instance, due to carbon dioxide, from whence has the oxygen been obtained? Professor Dewar also gave an interesting description of some difficulties met with and overcome by Professor Liveing and himself in obtaining the spectrum of mixtures of gas at the moment of their explosion. These mixtures were exploded in steel tubes provided with thick plates of mica at either end. A photograph of the spectrum was obtained by the discharge of an electric current through a piece of aluminium wire which caused its combustion at the moment of the explosion, giving an instantaneous illumination of the tube. At first the photographic plate gave a most complex spectrum, and then the precaution was taken to polish the inside of the tube, but with the same result. The interior of the tube was then electro-plated with various metals, when it was found that if metals of the nature of iron, nickel, or cobalt were exposed a complex spectrum was obtained; but when a volatile metal was used for electro-plating no emission of its spectrum occurred. The probable explanation of these results is that the force of the gas rushing along the tube picked off particles of non-volatile metals from the sides and these interfered with the spectrum. After showing the different spectra of the two bodies recently obtained from didymium by means of fractional precipitation, Professor Dewar referred to the spontaneous reversibility of some lines in the spectrum. In conclusion, the lecturer said he had recently received a communication from M. Stas, in which he stated that on repeating some experiments at the request of Dumas, he had obtained potassium in a state of purity never reached before. With the chloride prepared from this pure potassium a remarkable result has been obtained. When chloride of potassium had been employed in spectrum analysis, the distinguishing line of chlorine had previously always been obtained in the potassium spectrum, but with this pure salt no chlorine is visible. Stas also states that he has been examining the spectra of lithium, barium, calcium, strontium and magnesium and has endeavoured to decompose barium in order to see if he could obtain the distinguishing spectra of lithium, sodium or strontium from it. His results have been negative, however, and he has therefore come to the conclusion that these bodies, though possessing some similarities, can never have originated from the same source.

Parliamentary and Law Proceedings.

PHARMACY ACTS AMENDMENT BILL.

House of Commons.

Tuesday, April 5.

In the House of Commons at an early hour on Tuesday morning, upon the order for the second reading of the Pharmacy Acts Amendment Bill,

Dr. Farquharson rose and said: I rise, Mr. Speaker, to move the second reading of this Bill. Of course at this time of the morning (ten minutes to two o'clock) I shall not go into any details, but I will merely state to the House that the measure is promoted by the Pharmaceutical Society in the public interest. It is very necessary that chemists and druggists who have to make up our medicines should receive a competent training before going up for examination. The general tenour of

the Bill is that the candidates for the diploma of the Pharmaceutical Society shall be obliged to attend lectures upon botany, chemistry, and materia medica, and be compelled to go through a practical training for three years. I submit that this Bill is distinctly in the public interest, and I hope that the second reading may be now agreed to.

The question was then put from the chair, whereupon

Dr. Clark said: Mr. Deputy Speaker, I regret very much that so important a Bill should be brought forward at ten minutes to two o'clock in the morning, and I trust my hon. friend, Dr. Farquharson, will not press the second reading. The object of the Bill is to give additional powers to the Pharmaceutical Society—to give the Society, in fact, powers and privileges with which such a body ought not to be vested. Up to the year 1868 any one could carry on the business of a chemist or druggist, but in that year a register of chemists and druggists was drawn up and an examination was appointed by the Pharmaceutical Society to give a qualification to all who practised as a chemist or druggist. Now the Society wishes to go further; it wishes to be empowered to create a curriculum, and to compel those who desire to trade as chemists and druggists to pass in chemistry, botany and materia medica. If the Society were so empowered the chemist and druggist trade would simply be made a very close corporation, because the chemists and druggists in small towns and poor neighbourhoods would be unable to qualify. In large places like London, Liverpool, Manchester, Glasgow and Edinburgh, where you have courses of lectures on botany, chemistry, and materia medica, it will be quite easy for students to attend the courses and qualify themselves. Up to the present time all you have asked for is that those who practise as chemists and druggists should know something of their business. To go beyond that and allow this body to determine a curriculum and compel persons to go through that curriculum will be to limit the trade to a small number of men who will make a monopoly of it. In the next place I am opposed to the principle of the Bill. I think that all we have to do for the benefit of the public is to see that men who practise as chemists and druggists should pass a proper examination. To allow the Pharmaceutical Society to lay down a curriculum is beyond the province of legislation. By passing this Bill we should be giving up the principle of free trade altogether, and we should be limiting the selling of drugs to a very small and select class. If we intended to grant any power of this kind to any body it ought to be to some public body, and not to a mere society of traders, who can make their own bye-laws, and whose bye-laws would have all the effect of an Act of Parliament. If my hon. friend, Dr. Farquharson, perseveres with this Bill I shall be compelled to endeavour to amend it so as to make the Pharmaceutical Society representative of the 12,000 persons engaged in the chemist and druggist trade, and not merely of the 2000 members of the Society. I beg to move that the Bill be read a second time this day six months. There is no necessity for any change in the present system. The Pharmaceutical Society has passed certain rules or Bye-laws which are practically illegal, and now it is asking this House to give it power which it ought to have possessed before making the Bye-laws.

Mr. H. J. Wilson: I beg to second the amendment.

Upon the amendment being put,

Mr. Chance said: I think we must support this Bill, and for the reason that it will assimilate the English and Scotch law to the law of Ireland. The law in Ireland has undoubtedly worked well. It is said that there is something very severe in compelling attendance at certain lectures before examination and certification. I think, on the contrary, it is very beneficial to the persons concerned. Every one knows that it is a very common practice for men who have to pass examinations to go to some crammer who fills their minds with bits of information, and that governing bodies, knowing that this dangerous practice has to be encountered, are often in the habit of making examinations unnecessarily severe. If, however, governing bodies know that those presenting themselves for examination must have gone through a preliminary course of study, they are more inclined to let the examination partake more of a common-sense examination than otherwise. I do not think the operation of this Bill will work hardly upon any individual. The rights of old practitioners as chemists and druggists are already safeguarded under the main Act, and it is only proper in the interest of the safety of the public that men who have no qualification whatever should not have the right to dispense the most powerful poisons.

Dr. Tanner: Mr. Deputy Speaker, I do not rise for the purpose of opposing this Bill; on the contrary, I mean to support the Bill as far as I possibly can. There are several points in connection with this Bill which have not obtained that amount of due consideration which they are entitled to. At the present time there is a great deal of discontent because the rights of many chemists and druggists have not been properly respected. From time to time I have received communications from chemists and druggists, in which the writers point out that if this Bill is passed without due deliberation and proper debate, they will be placed in a position which it is quite certain that the promoters of the Bill will admit is nothing else but regrettable. I sincerely hope that a compromise may be arrived at. Instead of pushing the second reading of this Bill through the House to-night, perhaps it would be better if it were postponed, say until next Tuesday, or if the House does not adjourn for Easter, until some day next week. When the second reading comes on again, clauses may be submitted which will enable a great number of people who are employed as chemists and druggists—but who might be deprived of the employment by which they now find the means of livelihood—to continue their trade. There are a great many points in connection with this Bill which I should like to bring under the notice of the House, but as the hour is now so very advanced I will not do so. I sincerely trust, however, that the second reading of the Bill will be deferred for some days.

The House divided, when there appeared—

For the amendment	22
Against	76

The second reading was then agreed to.

On Wednesday morning, on the motion for going into Committee on this Bill, at the instance of Dr. Farquharson,

Mr. Hermon Hodge moved the adjournment of the debate. He hoped in doing so that he was not taking any step that might be considered improper; if so, he must plead the excuse of being a new member, though he felt sure that it could not be in accordance with the spirit which regulated the conduct of public business in this country, that a matter of such considerable importance—of such vital importance to those who were affected by it—should be considered at that hour (a quarter past two o'clock) in the morning. He was ignorant of the block having been removed, not being quite familiar with the rules of the House, but he thought he was fully justified, under the circumstances, in moving the adjournment of the debate.

Dr. Farquharson said that the hon. member had anticipated the course he himself proposed to take, which was, upon getting into Committee, to move to report progress at once. He knew that several members interested in the Bill were not present at that hour, and wanted an opportunity of considering their amendments.

Dr. Tanner: After the remarks which have fallen from the hon. member for Accrington (Mr. Hodge), I feel called upon to explain the reason why I, in the first instance, opposed the Bill, and, in the second place, withdrew my block.

The Deputy Speaker: Order, order. The question is

that this debate be now adjourned, and it is to that hon. members must now address themselves.

Mr. Chance considered that the hon. gentleman who moved the adjournment of the debate gave forcible reasons for the course he proposed, but if the hon. member who was moving to go into Committee would move to report progress, and ask leave to sit again on Tuesday, the 19th, it would give an opportunity for any hon. members who wished to put down amendments, or to challenge the principle of the Bill later on. He, therefore, trusted Mr. Hodge would see his way to allow the motion to be negatived on that distinct understanding, so that they could formally go into Committee, and then report progress.

Mr. J. W. Lowther confessed that he did not quite understand the views of the hon. gentleman who spoke last, and trusted that the hon. member (Mr. Hodge) would press his motion to a division.

Dr. Tanner would support the motion for the adjournment. From what he understood of the measure, he was not at all satisfied with it.

Dr. Clark thought his hon. friend, the member for West Aberdeenshire (Dr. Farquharson), might accept this motion. The Bill was only brought forward in the early hours of the previous morning, and it was a very important measure, affecting thousands of people whose livelihood might be taken away altogether. It was most desirable, therefore, that adequate opportunity should be afforded for considering it.

Mr. Biggar was very strongly in favour of the adjournment on the particular Bill at that particular time, and, therefore, as a matter of Parliamentary tactics, would advise the hon. member to persist in his motion.

The House then divided, when there were—

For the adjournment of the debate . . .	93
Against	29
Majority for	64

The debate therefore stood adjourned, the Committee being fixed for Tuesday, the 19th inst.

Obituary.

Notice has been received of the death of the following :—

On the 19th of January, Mr. Richard William Spindelow, Chemist and Druggist, Horne Street, Liverpool. Aged 72 years.

On the 3rd of March, Mr. William Cartwright, Pharmaceutical Chemist, Ironmarket, Newcastle-under-Lyme. Aged 67 years. Mr. Cartwright became a Member of the Pharmaceutical Society in 1844, and for many years filled the office of Local Secretary to the Society.

On the 21st of March, Mr. John Price Jones, Chemist and Druggist, Aberayron, Cardiganshire. Aged 64 years.

On the 31st of March, Mr. William Kitchin, Chemist and Druggist, King Street, Whitehaven. Aged 80 years.

BOOKS RECEIVED.

SCALELLA CHEMICA. A Series of Aids for Beginners in Chemistry. By HUSKISSON ADRIAN, M.A. Part I.—Analysis of Simple Salts. London: H. K. Lewis 1887. From the Publisher.

HANDBUCH DER ALLGEMEINEN UND SPECIALLEN ARZNEIVERORDNUNGSLEHRE. Edited by Dr. C. A. EWALD. Eleventh Edition. Berlin: A. Hirschwold. 1887. From the Publishers.

ANNUAL REPORT OF THE BOARD OF REGENTS OF THE SMITHSONIAN INSTITUTION, showing the Operations, Expenditures and Condition of the Institution, for the year 1884. Part II. Washington. From the Board.

Correspondence.

**** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE BENEVOLENT FUND.

Sir,—I am one of the multitude who do not contribute to the Benevolent Fund. I have no desire to air my reasons just now, but I think Mr. Snell's suggestion a very good one, and its adoption would certainly draw a subscription from me.

St. Anne's School, as taking both boys and girls, and the expenditure per head being about half that of Christ's Hospital, should have the preference.

The Pharmacy, Redhill. THOMAS PADWICK.

AUSTRALASIA.

Sir,—I am always much interested in anything that appears in your columns on our colonies, and the extract from a letter sent you by Mr. Priest last week was no exception. There is one sentence, however, in his letter which I should like to qualify slightly. He says, "all that is necessary at the start is a little money," etc. Now my sincere advice to any young man (having money) who contemplates emigrating to the colonies is to leave it at home for a few years. Let him serve some time as an assistant, so as to accustom himself to the ways of the country and its people, and guard himself against the pitfalls and temptations which are systematically laid for "New Chums" who are known to have a little money. Some young men feel inclined to emigrate to Australia in order to avoid the examinations at home. This again is a great mistake. I believe chemists in the larger cities and towns of Australia and New Zealand will compare very favourably with their fellow-tradesmen at home, both as to business tact and technical knowledge. The proper place for young men of that class is the Western States of America. There, it is by no means an uncommon thing to find an unqualified doctor and an unqualified chemist "running" a successful business together. Indeed, I have seen many a young unqualified druggists' assistant from the old country taken in hand by some other tradesman in the town, who knows nothing of drugs, and in partnership run a drug store. In addition to the privilege of being a partner in the firm, he will be styled "Doc." by a part of his customers, and his Christian name by the remainder. He can also, if successful, do up his place in American style in white and gold and marble, and go in for the delight of the American druggist, a handsome soda water fountain in the centre of his store. One more suggestion. Let no man emigrate late in life, not after say thirty-five, certainly not after he is forty years old. I have met men in Australia, New Zealand, the United States, and Canada, and they all seem to me to be unanimously of this opinion. They say that once a man exceeds forty he makes a poor colonist, because he finds it very difficult to accommodate himself to the new conditions that surround him, and is consequently dissatisfied and unhappy. I would again repeat (1) Leave your money at home for a time, until you know the country. (2) If you are going to Australia, pass your examination before you go. (3) Do not emigrate late in life. For young men who are prepared to rough it for a few years, the prospects in our colonies are decidedly better than those at home, but before leaving they must prepare themselves for two important factors which they will have to contend with, "Less social comforts," and "The love of home."

Llanelly, South Wales. GWILYM EVANS.

Erratum.—On p. 817, col. ii., the name of the author of the "Note on Water Softeners" should have been printed "E. J. Millard" instead of "J. T. Millard."

A. W. Forster—Vapor Acidi Benzoici, Throat Hospital.—Benzoic acid, 3 grains; kaolin, 12 grains. Rub together, and add water, ½ ounce; tincture of tolu, 18 minims. Shake and make up with water to 1 ounce.

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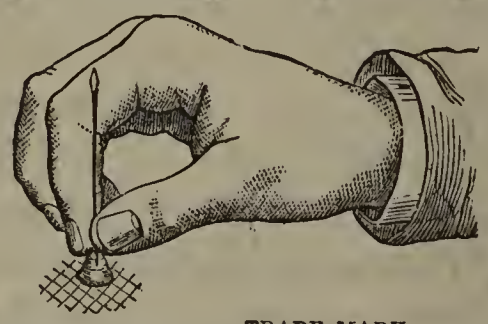

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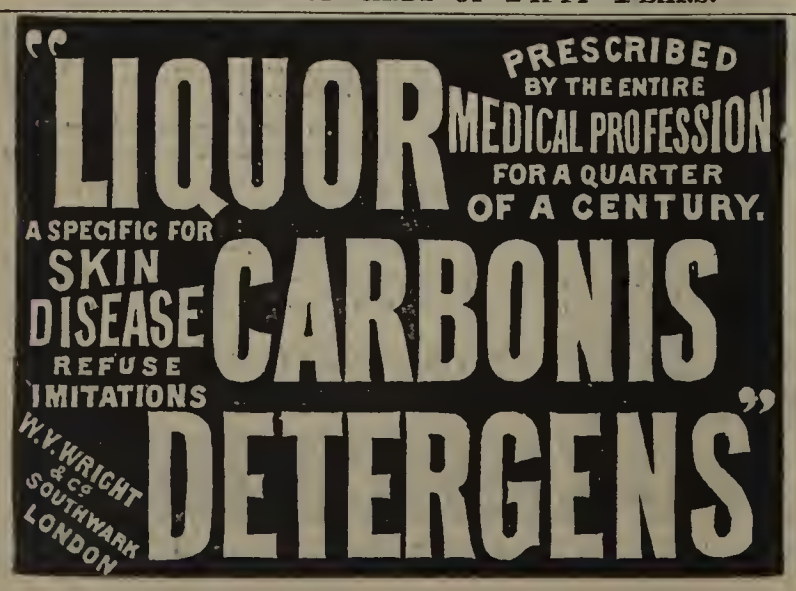

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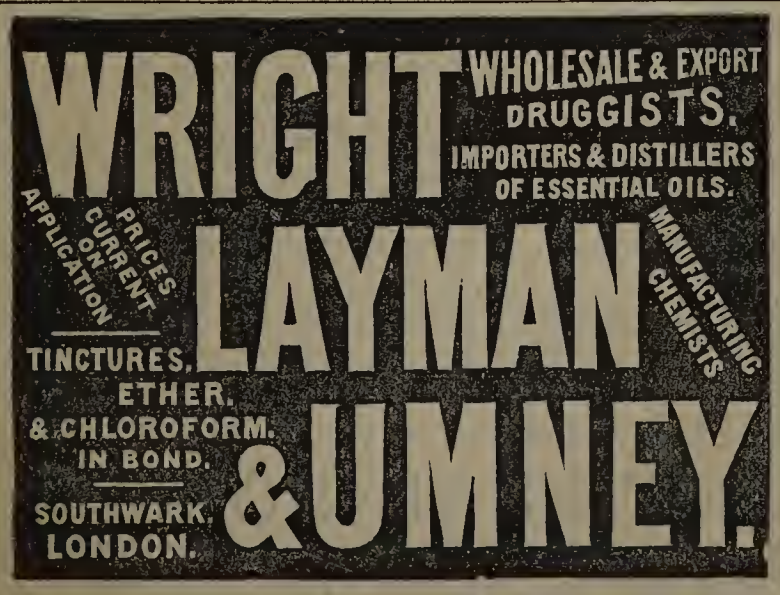

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The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 877.] SATURDAY, APRIL 16, 1887. [PRICE FOURPENCE

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

NOTICES.

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Butler, Edwd. Henry .. Humberstone Gate, Leicester.
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Hovenden, R. .. .. .. 31, Berners Street, W.
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Howlett, Samuel .. .. 4, Lindley Street, Mile End, E.
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Jones, Wm. Hy. ... ... 406, Caledonian Road, N.
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Kay, Thomas .. .. .. Lower Hillgate, Stockport.
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REFERENCE TABLE.

POISONS AND ANTIDOTES

POISONS.	ANTIDOTES.
I. ACIDS. (1) Sulphuric, Hydrochloric, Nitric.	1. Soda or Potash Bicarb., magnesia, chalk or whiting, or whitewash scraped off wall, in water. Soap, milk, eggs, olive or almond oil.
(2) Oxalic, Tartaric, Acetic.	1. Give freely charcoal, whiting, or whitewash scraped off ceiling or wall, in water.
II. ACONITE. Aconitine. 'Neuraline.'	1. Stomach tube, or 3 or more tabloids of Zinc Sulphate in water, by mouth. 2. Sal Volatile or Brandy. Strychnine. 3. Atropine, 1 tabloid hypodermically; if no improvement, Digitalin Tabloid. 4. Nitrite of Amyl, to be inhaled freely.
III. ALKALIES. Caustic Potash, Lime or Ammon.	1. Vinegar, lemon juice, other dilute acids, milk and oil.
IV. ANTIMONY. Tartar Emetic.	1. Stomach tube, to wash out stomach. 2. Tannin, 5 or 6 tabloids in warm water. 3. Sal Volatile, frequently if collapse; also Strychnine and Digitalin tabloids. 4. Morph. tabloid after acute symptoms. 5. Demulcents, as milk and white of egg.
V. ARSENIC. Fowler's Solution.	1. Stomach tube, to wash out stomach. 2. Dialysed iron, 2 oz., repeated often. 3. Sal Volatile, repeated. Demulcents. 4. Morph. tabloid, after acute symptoms. Enemeta peptonised with Zymine.
VI. BELLADONNA. Atropine.	1. Zinc tabloids or stomach tube. 2. Pilocarpine hypodermic tabloids. 3. Caffein, 1 tabloid hypodermically. 4. Physostigmine (cautiously).
VII. BELLADON. AND ACONITE.	As above, with Amyl Nitrite inhalations.
VIII. CANTHARIDES.	1. Apomorph., 1 tabloid hypodermically. 2. Demulcents. *Avoid fats and oils.* 3. Morphine, 1 tabloid hypodermically.
IX. CARBOLIC ACID. Blistering Fluid.	1. Zinc Sulphate, 3 tabloids in water. 2. Stomach tube, use cautiously; introduce Epsom Salts or any Sulphates. 3. Saccharated Lime, eggs and milk. 4. Caffein. Amyl Nitrite inhalations.
X. CHLORAL. Syrup of Chloral.	1. Zinc tabloids, or stomach tube. 2. Strychnine tabloid hypodermically; repeat if necessary. Rouse patient. 3. Amyl Nitrite inhalations frequently. 4. Caffein tabloid. *Keep patient warm.*
XI. DIGITALIS.	1. Apomorph., 1 tabloid hypodermically 2. Tannin, 3 or more tabloids in water. 3. Aconitin, 1 tabloid hypodermically. 4. Sal Volatile frequently. Maintain decubitus.
XII. HYDRARG. PERCHLOR. Corros. sublimate.	1. White of egg freely; then wash out stomach. Demulcents. Morphine tabloids if needed.
XIII. HYDROCYANIC ACID. Prussic Acid. Potass. Cyanide.	1. Sal Volatile (and Atropine tabloids). 2. Artificial respiration, alternate cold and warm affusions to spine. Ether subcutaneously.
XIV. NUX VOMICA. Strychnine.	1. Apomorph., 1 tabloid hypodermically 2. Tannin, 5 or 6 tabloids in hot water. 3. Chloral, 3 tabloids, and Bromide of Potassium, 6 tablets, dissolved together in hot water repeatedly. 4. Nitrite of Amyl inhalations frequently 5. Curare tabloid, 1/2-gr. hypodermically.
XV. MUSHROOMS *Poisonous.*	1. Three Zinc tabloids or more in water. 2. Atropine tabloid hypodermically. 3. Stimulants and Castor Oil.
XVI. OPIUM. Laudanum. Morphine.	1. Apomorphine tabloid hypodermically. 2. Atropine, 2 tabloids hypodermically. 3. Caffeine tabloids hypodermically. 4. Amyl Nitrite inhalations. *Artificial respiration. Galvanism.*
XVII. OPIUM & BELLADON.	1. Apomorphine, 1 hypodermic tabloid. 2. Caffeine tabloid hypodermically. 3. Nitrite of Amyl inhalations.
XVIII. OPIUM & CHLORAL.	1. Apomorphine, 1 hypodermic tabloid. 2. Sal Volatile, a teaspoonful in water. 3. Atropine, 2 tabloids hypodermically. 4. Strychnine, 1 tabloid hypodermically, repeated. 5. Caffeine tabloid hypodermically.
XIX. PHOSPHORUS. Rat Paste.	1. Copper. Zinc, 3 or 4 tabloids in water by mouth. *Avoid fats and oils.* 2. *French Oil of Turpentine*, half a drachm by mouth every half-hour. 3. Morphine tabloid afterwards.
XX. PHYSOSTIGMA. Calabar bean.	1. Apomorphine, 1 hypodermic tabloid. 2. Atropine, 1 tabloid hypodermically every quarter of an hour. 3. Chloral, 1 tabloid in water every quarter of an hour. 4. Strychnine, 1 hypodermic tabloid.

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THE PHARMACOPŒIAL TEST FOR THE PURITY OF ETHER.*

BY PROFESSOR DUNSTAN AND THOMAS S. DYMOND.

In the recent edition of the British Pharmacopœia, under the heading of "Æther Purus," a new test of purity is described. "When shaken with a fourth of its bulk of solution of potassium iodide and a little starch paste, no blue colour is produced." In the reprint of the British Pharmacopœia which has lately been issued, the words "little or no" are inserted after the words "starch paste." The test doubtless takes its origin in a paper by Warden (*Pharm. Journ.*, [3], xv., 521), in which he states that commercial specimens of ether frequently liberate iodine from potassium iodide, and when digested with solid potash yield a yellow incrustation. From these facts he infers that aldehyde is present, which, if true, would be of considerable medical importance. Now although the action of potash might possibly afford grounds for the supposition that aldehyde exists in the ether, the fact of the liberation of iodine from potassium iodide cannot be held to do so, since aldehyde is without action on this salt. Nevertheless it appears that the test was introduced into the Pharmacopœia as a safeguard against the presence of aldehyde. On these grounds, E. Werner (*Pharm. Journ.*, [3], xvi., 660) has already justly criticized and condemned the Pharmacopœial test. He regards the liberation of iodine from potassium iodide as the result, not of an actual impurity in the ether, but of its decomposition under the influence of air and light, whereby ozone is formed. This hypothesis was propounded many years ago by Schönbein, but Werner does not adduce any further experimental evidence in its support. We find that the following are the principal statements that have been made with regard to the liberation by ether of iodine from potassium iodide.

E. Ferrière (*Journ. Pharm. Chim.*, [4], xvi., 107) alleges that ether at once liberates iodine from a strong solution of potassium iodide, and slowly liberates it from a dilute solution.

Buchner (*Chem. Zeit.*, ix., 69) states that ozone is rapidly formed when ether is exposed to light, and that this body is the cause of the liberation of iodine.

Kingzett has alluded to this action in several papers. We have not been able, however, to find that he has given any details of his experiments, which are said to prove that hydrogen peroxide is formed, as well as acetic ether, when air is passed through ether. The intermediate formation of acetyl peroxide is assumed to account for these results.

A consideration of these different statements convinced us that the reaction had not yet been fully investigated, and that there was a necessity for further experimental work. The investigation of the subject presents many practical difficulties, but we have obtained results sufficiently definite to enable us to draw some interesting conclusions.

At the commencement of the work we put before ourselves the following questions which appeared to us could be answered by a direct appeal to experiment:—

1. Does "pure ether," that is ether freshly prepared, having a specific gravity of 0·730 and a boiling point of 35° C., liberate iodine from potassium iodide?

2. Does such ether when exposed to light and air undergo a decomposition in which some substance capable of liberating iodine from potassium iodide is formed? and if so, what is the nature of the substance?

3. (In the event of these questions being answered in the negative). What is the nature of the impurity that exists in some specimens of ether which is able to liberate iodine from potassium iodide?

1. *The Action of Ether on Potassium Iodide.*—We find that "pure ether" does not immediately liberate iodine from a very dilute solution of potassium iodide. Ten cubic centimetres of ether mixed with 10 cubic centimetres of water containing two or three drops of a 10 per cent. solution of potassium iodide (the strength of the solution of the Pharmacopœia) causes no immediate liberation of iodine; that is, the mixture after being shaken will not become yellow after a few minutes, although after a longer time a faint yellow tinge will be observed. We prefer not to use starch as an indicator of the free iodine, for if the mixture is contained in a test-tube, any formation of yellow colour is quite perceptible. If diluted sulphuric acid is added to the mixture, the liberation of iodine takes place more rapidly. If stronger solutions of potassium iodide are used, the liberation of iodine also occurs more rapidly. In fact our experiments show that the amount of iodine liberated in a given time is dependent on the strength of the solution of potassium iodide which is used. A strong solution of hydriodic acid is rapidly attacked by ether and iodine is liberated. In these cases it seems probable that butane is formed, in accordance with the reaction discovered by Frankland during his investigation of the action of light on ethyl iodide. The reaction of ether with potassium iodide and hydriodic acid is much accelerated by light, and it is a matter of common knowledge that even a solution of pure potassium iodide is slowly decomposed, with liberation of iodine, when exposed to sunlight. It ought to be observed that the amount of iodine which is immediately liberated by ether from a solution of potassium iodide is small, but yet this quantity would be indicated by the Pharmacopœial test; at any rate, as that test was first given in the Pharmacopœia. The ether used in these experiments had been prepared in the usual way from alcohol and sulphuric acid, and in addition to the ordinary purification had several times been washed with water and redistilled.

2. *The Action of Oxygen and Light on Ether.*—A bottle half full of "pure ether" was exposed to direct light for two months; it did not after this exposure act on a dilute solution of potassium iodide. An experiment made with pure ether and water gave the same negative result. In order to fully investigate the action of oxygen on ether the following experiments were made. Through 200 c.c. of ether 8 litres of air were slowly passed. No iodine-liberating body was formed. The experiment was repeated using warm ether saturated with water, but still the ether did not react with potassium iodide, neither did it after the passage of air had been continued for some hours. In these experiments an india-rubber connection had been used in the apparatus, and since contact with india-rubber immediately destroys

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, April 13.

ozone, an apparatus was constructed entirely of glass' and oxygen was used instead of air. The ether saturated with water was contained in a retort connected with a condenser. It was warmed to about 30° C. and oxygen was passed through it in a regular stream during two days, the ether which distilled being repeatedly returned to the retort. About 200 litres of oxygen were used. Now, if the ether had reacted with the gas at all under these conditions a considerable quantity of the iodine-liberating body would have been formed, but we found that it was unaffected by this treatment as regards its action on a dilute solution of potassium iodide. Although this experiment had been conducted in day-light, the ether was further exposed for one month, after which time no iodine-liberating substance had been formed. In other experiments ether acidified with dilute sulphuric acid was used, but these also gave negative results. Some commercial specimens of ether were slightly acid in reaction, and became more so when kept. In consequence of this, unless they were first neutralized they liberated a small quantity of iodine from the potassium iodide solution.

We have also examined a specimen of "pure" ether which had been exposed to light for about ten years in the Museum of the Pharmaceutical Society. This specimen acted slowly on strong potassium iodide solution, but did not contain a trace of hydrogen peroxide.

3. *The Nature of the Iodine-liberating Compound in certain Specimens of Ether.*—In the course of one experiment we observed that some specimens of commercial ether reacted at once with a dilute potassium iodide solution, and the mixture rapidly became dark yellow. The specimens which reacted most powerfully had been derived from methylated spirit. It was evident in these cases that some form of "active oxygen" was present, either ozone or hydrogen peroxide. It is highly improbable that ozone exists in ether, first, because conditions analogous to those under which it is known to be formed do not obtain here, and secondly, because Berthelot has shown that ozone powerfully attacks ether, forming a new compound, ethyl peroxide. Yet we thought that this was a convenient opportunity to settle once and for all whether ozone was actually present or not. There were three reactions of which we took advantage to determine this:—(α) Metallic mercury or silver instantly decomposes ozone, but these metals only slowly withdraw the active oxygen from hydrogen peroxide. A specimen of the impure ether was shaken for a few seconds with metallic mercury and then filtered, the filtrate liberated iodine to the same extent as the original ether. The ether was subsequently allowed to remain in contact with the mercury for some hours, during which the ether slowly lost its power of liberating iodine. (β) A dilute solution of hydrogen peroxide is rapidly decomposed when it is warmed or allowed to stand with an alkali. Ozone is unaffected by an alkali. This distinction is somewhat difficult to apply when ether is present, and in consequence is perhaps not wholly conclusive. Some of the impure ether was warmed with a solution of sodium carbonate, and the escaping gas was passed into a solution of potassium iodide without producing any effect. The ether which remained did not liberate iodine from dilute potassium iodide. These two results pointed to the absence of ozone, and to the presence of hydrogen peroxide. The existence of hydrogen peroxide was conclusively proved by its unique reaction with chromic acid. (γ) About 20 c.c. of the impure ether were added to about half the quantity of a very dilute solution of potassium chromate acidified with dilute sulphuric acid. After shaking the mixture the ether separated of a deep blue colour, owing to the formation of the so-called perchromic acid. It was then shown that the impurity in ether which liberates iodine from a dilute solution of potassium iodide is hydrogen peroxide. It is present, however, to a very small extent; 100 cubic centimetres of the specimen which gave the strongest indications with chromic acid, when mixed with dilute sulphuric acid, liberated an amount of iodine which corresponded with ·04 per cent. of H_2O_2. The specific gravity of this specimen was ·741, and its boiling point was 34° C. Ether prepared from methylated spirit, and purified by the process of the Pharmacopœia, did not at first contain any hydrogen peroxide, but after it had been kept for some days traces of this substance had formed. Light does not appear to be essential to the production of the peroxide, for in this case the specimen had been kept in a nearly dark cupboard. It is next to impossible to determine the nature of the substance produced during the preparation of ether which gives rise to the formation of this small quantity of hydrogen peroxide, on account of the many and unknown bye-products of the reaction of sulphuric acid and alcohol. Possibly it may be a minute quantity of the remarkable substance obtained by Legler (*Ann.*, ccxvii, 381; *Ber.*, xiv., 602), by imperfectly oxidizing ether at a low red heat, and which is capable of yielding hydrogen peroxide We have obtained from the specimen of impure ether, by spontaneous evaporation, a pungent residue containing hydrogen peroxide, which acted powerfully on potassium iodide.

This impurity, whatever may be its nature, can be removed from the freshly distilled ether during the process of manufacture by using more than sufficient lime to completely neutralize the acid distillate, and subsequently twice washing the purified ether with alkaline water. Ether carefully prepared in this way does not develop any hydrogen peroxide when it is kept.

The results recorded in this paper enable us to draw the following conclusions, namely:—

Ether prepared from sulphuric acid and alcohol liberates iodine from strong solutions of potassium iodide, and very slowly from dilute solutions. The reaction is accelerated by the presence of acid.

Neither ozone nor hydrogen peroxide is formed under ordinary atmospheric conditions by contact of pure ether with air even when exposed to light.

Some commercial specimens of ether contain an impurity which forms hydrogen peroxide after a short time. If it is thought desirable to guard against the presence of the minute quantity of this substance which is formed, the present Pharmacopœial test should be superseded by the application of the chromic acid reaction for hydrogen peroxide, and it should also be provided that the specimens do not leave any pungent or acid residue when spontaneously evaporated. Although such specimens of ether would act on potassium iodide, yet it is best not to specify this as a general test for impurity, since all ether prepared from sulphuric acid and alcohol, however carefully purified, is liable

to react in the same way, unless the solution of potassium iodide used is very dilute.

From these experiments it is clear that ether prepared from sulphuric acid and alcohol, and carefully purified by the Pharmacopœial process until it has the proper specific gravity and boiling point, is able to slowly act on potassium iodide. If this is due to a persistent impurity, its quantity must be exceedingly small, since it has no effect on the specific gravity or boiling point. It appeared, however, to be of interest to ascertain if ether prepared by an entirely different reaction also liberated iodine. Ether was prepared by the reaction of sodium ethoxide and ethyl iodide—

$$NaOC_2H_5 + C_2H_5I = (C_2H_5)_2O + NaI.$$

When shaken with a ten per cent. solution of potassium iodide it did not liberate iodine until it had stood for three hours, and then only traces were set free. Hydriodic acid at once caused the liberation of iodine. From this it seems that ether prepared from ethyl iodide does not act on potassium iodide. The action of hydriodic acid on this specimen suggests whether the action which occurs when ether prepared from sulphuric acid is used may not be due to the presence of a minute quantity of some substance which can form hydriodic acid from potassium iodide, possibly ethyl sulphate.

[*The discussion on this paper is printed on p.* 849.]

THE PHARMACEUTICAL PREPARATIONS OF ATROPA BELLADONNA.*

PART III. SUGGESTIONS FOR STANDARD GALENICAL PREPARATIONS.

BY PROFESSOR DUNSTAN AND FRANCIS RANSOM.

Before any proposal can be made to introduce into the British Pharmacopœia standard galenical preparations of potent drugs, that is preparations which contains a constant quantity of the active principle or principles, we require to know (i.) how to accurately estimate the quantity of the active principle in the crude drug from which the preparations are to be made; (ii.) what solvent ought to be used to extract the active constituents; (iii.) what part of the plant is best used; (iv.) what physical condition of the preparation is most compatible with the production of a standard preparation; and (v.) how to estimate the quantity of the active constituents in the preparations. Further, there remain several practical details to be considered and investigated. This work has already been carried out by one of us as far as *Strychnos Nux-vomica* is concerned, and standard galenical preparations are now included in the British Pharmacopœia. During the past three years we have been engaged in the investigation of *Atropa belladonna* and its preparations. We have devised methods for estimating the quantity of the isomeric alkaloids atropine and hyoscyamine in the root and leaves of the plant as well as in the galenical preparations derived from them. In the present paper we have to record the results obtained from further experiments, and to make some suggestions for standard galenical preparations.

Part of the Plant to be Used.—We propose to use the root for the production of the pharmaceutical preparations. The difference in the alkaloidal value of the root and leaves is not sufficiently great to be of any moment, while the experimental difficulties that arise when the leaves are used, owing to the large amount of colouring matter and fat which are present, completely prevent a preparation of the leaves being made of constant strength by any practicable method. The British Pharmacopœia has already introduced an extract prepared from the root for one prepared from the leaves, and we now suggest that the tincture should also be produced from the root. One advantage of this is that it brings all the pharmaceutical preparations into direct connection with one another.

The Solvent to be Used.—From the analyses of the commercial extract which we have already published it is clear that although the Pharmacopœia directs that rectified spirit should be used as the solvent, alcohol containing much more water than rectified spirit is largely employed. The question for investigation is whether rectified spirit is or is not the most effectual solvent for the alkaloidal salts of belladonna root. This question can only be settled by comparative experiments made with alcohol of different strengths in order to determine what quantity of the salts are extracted from a certain amount of powdered root by these different mixtures of alcohol and water. Our results are shown in the following table:—

No. of experiment.	Proportion of rectified spirit to water.	Per cent. of alkaloid in tincture.	Per cent. of dry residue.	P. c. of alkaloid in dry residue.	Per cent. of alkaloid in extract containing 18 per cent. of water.
I.	100 : 0	0·115	1·96	5·9	5·0
II.	100 : 25	0·172	4·76	3·6	3·0
III.	100 : 33	0·165	5·27	3·1	2·63
IV.	100 : 50	0·160	6·32	2·5	2·12
V.	100 : 60 (Proof spirit)	0·127	8·18	1·6	1·36
VI.	100 : 100	0·105	—	—	—

The finely powdered root (4 ounces) was macerated for forty-eight hours and then percolated with the solvent until 10 fluid ounces of tincture were obtained. Fifty cubic centimetres of the percolate were evaporated to dryness and the residue weighed; the atropine and hyoscyamine were then isolated by the process we have previously described (*Pharm. Journ.*, [3], xvi., 777). From these results it appears that rectified spirit mixed with one-fourth of its volume of water is the best solvent for the alkaloidal salts in belladonna root. It is shown to be a better solvent than rectified spirit alone, and a better solvent than alcohol, which contains more than this quantity of water; in fact as the amount of water is further increased the quantity of alkaloidal salts extracted diminishes, until when equal volumes of spirit and water are used the quantity extracted is less than that by the spirit alone.

Another instructive fact which is brought out by these results shows the fallacy of depending on the specific gravity or on the amount of dry extract yielded by a tincture as a test of its quality or strength. Those tinctures which were prepared with alcohol containing one-fourth of their volume of water would have the highest specific gravities and actually yield the largest quantities of dry extract, while they also would contain the smallest quantity of alkaloid. Column V. well illustrates a point to

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting, April 13.

which we have drawn attention before, namely, that one and the same specimens of belladonna root can be made to yield extract containing an amount of alkaloid varying from 1¼ to 5 per cent. by merely diluting the alcohol which is used for the percolation of the drug.

Preparation of the Standard Extract.—In deciding on the kind of extract which shall be taken as the standard, we have been largely guided by questions of practical convenience. There are two physical conditions of an extract in which it is feasible to standardize it, the semi-solid extract and the dry extract. In the case of nux vomica there is not sufficient difference in the alkaloidal content and in the ratio of alkaloidal salt to extractive matter, in good commercial specimens, to prevent the competent pharmacist from preparing and dispensing a reliable standard extract. With belladonna the case is different, since so far as we have been able to ascertain, the ratio of extractive to alkaloid is subject to considerable variation, and although in case of need it would no doubt be possible to standardize the conventional extract, yet we think on the whole that a dry extract will be more convenient for general adoption. Before such a proposal can be accepted, it must be shown that the alkaloidal salts of belladonna (principally malates) are not affected by the heat necessary for evaporation to dryness. Two specimens of the ordinary extract, which contains about 18 per cent. of water, were prepared, and the quantity of atropine and hyoscyamine estimated in each. They were then evaporated over a water-bath until they ceased to lose weight. From the dry extracts exactly the same amount of alkaloid was isolated as from the semi-solid extract, showing that the alkaloidal salts are not decomposed at 100° C. From a consideration of the average strength of the present extract, we propose that 2 per cent. of atropine and hyoscyamine shall be taken as the standard quantity. No good specimen of belladonna extract by the suggested solvent will ever yield a dry extract which contains less than 2 per cent. of alkaloid. Generally the strength of the dry extract prepared according to the method now proposed will be between 3 per cent. as a minimum, and 5 per cent. as a maximum. To reduce these extracts to the standard strength of 2 per cent. we suggest that a sufficient quantity of powdered milk-sugar should be added. The dry residue is always hygroscopic, but when thoroughly evaporated with powdered milk-sugar it may be kept in a properly closed bottle without any appreciable deterioration in strength. Since this extract is wholly soluble in water, or in the mixture of spirit and water with the aid of which it was prepared, all the preparations of belladonna might be produced from it as a starting point. Or, if it is thought that any advantage is to be gained, the tincture and liniment might be made by diluting the strong percolate which is obtained during the preparation of this extract, as one of us has before suggested for tincture of nux vomica, the other suggested alternative, namely the solution of a definite quantity of the standard extract being, however, we think with justice, adopted in the British Pharmacopœia. Any modification in detail might be adopted by manufacturers on the large scale, since the directions of the Pharmacopœia are mainly intended for the production of relatively small quantities. It is proposed that the tincture shall contain ·034 per cent. of alkaloid, that is, it will be sixty times weaker than the extract, or will contain almost exactly three-twentieths of a grain of alkaloid in one fluid ounce, and the liniment it is proposed shall contain ·2 per cent. of alkaloid. A standard plaster might also be prepared from the standard extract.

Standard Extract of Belladonna.

Take of—

Belladonna root in No. 20 powder	1 pound.
Rectified spirit	48 fluid ounces.
Distilled water	12 fluid ounces.

Mix the spirit with the water. Macerate the belladonna in 2 pints of this mixture for forty-eight hours, agitating occasionally; then transfer to a percolator, and when the fluid ceases to pass continue the percolation with the remainder of the diluted spirit. Afterwards subject the contents of the percolator to pressure, filter the product, mix the liquids, and measure the exact volume of the mixture (*a*). Estimate the alkaloidal nature of this solution by the following method.

Evaporate 50 cubic centimetres of the liquid over a water-bath with a gentle heat, until all the alcohol is dispelled. Dissolve the extract thus obtained in about 5 cubic centimetres of warm distilled water, acidulated with a few drops of diluted hydrochloric acid; filter, if necessary, through a small fragment of cotton wool; pour into a stoppered glass separator, and add ammonia until the solution is distinctly alkaline. Agitate for a few minutes with 5 cubic centimetres of chloroform, separate, and again wash the aqueous liquid with 3 cubic centimetres of chloroform. Agitate the mixed chloroformic solutions with 5 cubic centimetres of diluted hydrochloric acid, separate, again wash with 3 cubic centimetres of the diluted acid, mix the acid solutions, render alkaline with ammonia, and agitate with 5 cubic centimetres of chloroform. After separation wash the alkaline solution with 3 cubic centimetres of chloroform, mix the chloroformic solutions, evaporate in a dish of known weight and dry the residue, which should be nearly colourless at a temperature of 200° F. (93° C.). The weight of the residue thus obtained multiplied by two will give the parts by weight of the alkaloids in 100 fluid parts of the liquid. The exact volume of this liquid being known and the strength having been thus ascertained, calculate the total amount of alkaloid present therein.

Evaporate to dryness over a water-bath, and add sufficient sugar of milk to make the mixed product exactly fifty times the weight of the total alkaloid found to have been present in the liquid (*a*), allowing for that quantity which was used for the estimation. Mix intimately, powder as quickly as possible in a dry atmosphere, and transfer at once to a well-stoppered bottle. This extract will contain 2 per cent. of total alkaloid.

Liniment of Belladonna.

Take of—

Standard extract of belladonna	3 ounces.
Camphor	1 ounce.
Rectified spirit	24 fluid ounces.
Distilled water	6 fluid ounces.

Dissolve the camphor in the spirit and the extract in the slightly warmed water. When cold mix the two solutions, allow any undissolved sugar of milk present to subside, and pour off the clear liquor, which should measure 30 fluid ounces. One hundred

fluid grains of this liniment contain $\frac{1}{5}$ grain of total alkaloid, that is ·2 per cent. of atropine and hyoscyamine.

Tincture of Belladonna.

Take of—

Standard extract of belladonna	148 grains.
Distilled water	4 fluid ounces.
Rectified spirit, a sufficiency.	

Dissolve the extract in the warmed water and then add sufficient spirit to produce twenty fluid ounces. Allow any undissolved sugar of milk to subside and decant the clear solution. One fluid ounce of this tincture contains $\frac{3}{20}$ grain of total alkaloid. One hundred cubic centimetres evaporated to dryness in the water-bath will leave a residue containing ·034 grain of atropine and hyoscyamine, these alkaloids to be isolated by the process we have previously described.

[*The discussion on this paper is printed on p.* 849.]

HUECHYS SANGUINEA: DOES IT VESICATE?*

BY JOHN MOSS, F.I.C., F.C.S.

On January 13 of this year, there appeared in the London drug market a fly, which was catalogued as "Chinese Cantharides." Hong Kong was the port of shipment. The appearance of the fly was sufficiently remarkable, and it may be described briefly as a Coleopterous insect, from twelve to fifteen-sixteenths of an inch long (*Cantharis* is ten to fourteen-sixteenths) with a vermilion-red abdomen and dull blackish-brown thorax and wing cases. It has also very large and prominent eyes, two large vermilion cordate spots symmetrically placed behind the head, and a keel-like protuberance of the same colour between the eyes, but rather below them. It has the smell of cantharides.

It is *Huechys sanguinea*, and in an extract from Dr. Porter Smith's 'Chinese Materia Medica,' for which I am indebted to Mr. E. M. Holmes, it is thus referred to:—

"Red Lady Bug (*Hung-liang-tsze*).—This insect, found upon the ailanthus and several other trees at Hankow, is a sort of red cicada, making a grinding noise. It has a red body and dark wings, and is collected in large quantities by the country people for the druggists, who use them as blistering flies. They are much less powerful than the *Mylabris Cichorii*."

As we are practically dependent on *Cantharis* and *Mylabris* for blistering effects, any new agent by which similar effects may be produced is sure to excite interest. A small sample was obtained, and more than half of it (5·574 grams) was treated as for liq. epispasticus, B.P. When applied to the arm the liquor produced no blister and apparently no other effect. The powdered flies were then completely exhausted with acetic ether and the whole of the liquid evaporated and the residue dried till the weight was constant at 1·864 gram, or 24·61 per cent. The residue was heated with carbon bisulphide and 1·667 gram (22 per cent.) was obtained of a brown granular fat, having the consistency of dripping and melting at 80° F.

The part insoluble in carbon bisulphide, when collected with acetic ether, filtered, evaporated and weighed gave 0·189 gram (2·495 per cent.) of a yellowish oily looking body, of a non-crystalline character. This acted as a mild rubefacient when applied to the skin of the upper arm. It is sparingly soluble in ether, partly soluble in chloroform, and readily soluble in alcohol. It is neutral to litmus and melts at 79° F.

As it has happened ere now that the oil of cantharis when removed by carbon bisulphide has taken away with it a considerable amount of vesicating principle, the oil from *Huechys* was tested, but with a negative result. It is also on record that sometimes the cantharidin is so associated in Spanish flies that ordinary solvents fail to remove it, and it is very necessary to use an alkali in order to bring it into a tractable condition. To make assurance doubly sure therefore the treated *Huechys* was made into a paste with strong caustic potash solution and dried; after drying it was neutralized with dilute hydrochloric acid and again dried, powdered and exhausted with acetic ether. A yellow residue was obtained quite destitute of even rubefacient power.

Assuming then that the insects experimented upon were mature, as I believe them to have been, and the vesicating properties were fully developed, *Huechys sanguinea* will not be a useful addition to our materia medica.

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, April 13.

NOTE ON HENNA LEAVES.

BY C. J. S. THOMPSON.

The leaves of the *Lawsonia alba*, known in the East as henna, rank amongst the oldest of the vegetable dyes used by the ancients. They have been employed as a dye for centuries in Egypt, and are still held in repute and extensively used by the Arabs. They are principally used by the women, who stain the palms of their hands, the tops of their fingers and nails, also by the men for dyeing their hair and beards a dark orange colour.

Still further East, in Persia, they are used to dye leather and the tails of the horses, which are often decorated in divers colours.

Henna was known and used by the Jews, and we find allusion made to it several times in the Old Testament.

The *Lawsonia alba*, or *L. inermis*, belongs to the natural order Lythraceæ, and is a shrub that grows abundantly in the countries of the East. It does not appear to possess many medicinal properties, beyond the leaves being astringent, owing to the amount of tannin and gum they contain. It is stated that the powdered leaves, formed into a paste with oil, and applied externally, give relief to headache. The leaves are small, and somewhat leathery in texture, are oval in form, with entire margins. The dried leaf when broken has a brittle fracture, and a section examined by the microscope exhibits the cells crowded with the brown colouring matter. This colouring matter may be very easily extracted, it being almost entirely soluble in hot water.

The leaves should first be reduced to a coarse powder, then macerated for two or three hours in boiling water, and strained. Boil the residue in two or three successive quantities of water till thoroughly exhausted, mix, and evaporate the strained liquors.

They will be found to yield from 12 to 15 per cent. of a dark brown gum.

This brown gum is readily soluble in hot water, glycerine, strong solutions of potash and ammonia and dilute acids, but very slightly in ether, chloroform or alcohol.

The colour of the watery solution is intensified by alkalies and diminished by strong acids. It turns black on addition of ferric salts. The leaves also yield 2 per cent. of an olive green resin that is soluble in ether and alcohol.

The following rough method is employed by the Arabs in preparing henna for their use.

The leaves and young twigs are dried and powdered, then allowed to stand for some days moistened with water. The mass is afterwards boiled with more water for some hours, and this decoction is diluted or not, according to the shade of colour it may be desired to produce.

THE CHARACTERS OF OLIVE OIL.

BY A. LEVALLOIS.

In a communication recently made to the Academy of Sciences* the author gives some of the results obtained in an investigation undertaken at the Agricultural Station, Nice, upon the products of different varieties of olive trees in the south-east of France and as to the modifications in the composition of the olives. The investigation lasted during the whole time of collection in the district, a period of seven months, and placed at the disposition of the author a certain number of samples of oils prepared from olives differing considerably in their maturity and origin. The indisputable authenticity and variety of these samples induced him to commence an examination of some of their properties, especially those that might serve as a guide to the analyst. The oils had been obtained by crushing the olives and pressing the paste, without the addition of water.

Intensity of Colour.—This was determined by means of Duboscq's colorimeter. It was found that an oil from one and the same variety might at the end of the harvest be seventeen times less coloured than at the commencement.

Density.—The density of all the oils varied only between 0·9167 and 0·9177 at the temperature of 13° C. The highest of these figures was given by "Blanquetier" oil, a variety appearing to deviate generally in its characters from other olive oils. The oils from any single variety, prepared at different times, presented only very slight differences. Constancy in density would therefore be a very valuable character that would assist considerably in distinguishing olive oils from other oils. Some of the most important of other commercial oils were also examined; it was not possible to prepare them in the laboratory, but the conditions under which they were obtained allow of their being considered pure. Whilst an olive oil showed a density of 0·911 at 24° C., the following figures were obtained for different oils at the same temperature:—

Sesame oil	0·917
Cotton-seed oil	0·9165
Arachis oil	0·912
Poppy-seed oil	0·9205
Colza oil	0·910
Camellia oil	0·920
Linseed oil	0·928

The density of arachis oil and that of colza oil are near that of olive oil; but in their other characters these oils differ so widely that it would be impossible to confound the three products.

Action of the Reagents of Cailletet and Audoynaud.—Cailletet's reagent (commercial nitric acid, containing nitrous fumes) gave with various samples of olive oil a green coloration, but this colour was not always pure. The "Blanquetier" oil, notably, gave a green charged with yellow. The reaction indicated by Audoynaud, that of nitrosulphuric acid and ether upon oil containing potassium bichromate, most frequently gave a free green coloration; in some cases the tint was mixed with yellow. An "Arabanier" olive oil, prepared on April 3, was coloured a yellow-green.

Action of Bromine.—The two methods for the determination of non-saturated fatty acids by the absorption of bromine by the unsaponified oil, which have recently found application in England, have yielded to their authors results that presented considerable divergencies and anomalies. In measuring the absorption of bromine by various oils M. Levallois adopted the following method of operating, which was found to be very rapid:—5 grams of oil was weighed into a test-tube about 15 cm. long and 15 mm. in diameter, and to this was added 10 c.c. of a 20 per cent. solution of potash in 93° alcohol. Upon agitation the oil dissolves; the tube is then closed imperfectly and heated in a water-bath to a temperature sufficient to produce a slight ebullition of the solution. At the end of a quarter of an hour the saponification is completed. In operating upon olive oil the volume of the liquid is brought up by means of alcohol to 50 c.c. Of this alcoholic solution 5 c.c. is placed in a glass-stoppered tube, acidified with hydrochloric acid, and then by means of a graduated burette, aqueous solution of bromine, as concentrated as possible, is poured into the tube. After each addition the mixture is briskly agitated, and the addition is stopped when the liquid takes a persistent light yellow tint. The correction necessary to obtain a distinctly perceptible tint is about 0·1 c.c. The action of bromine on the non-saturated acids thus set free has been found to be sensibly constant under the conditions indicated. The titration of the bromine solution is made with 10 c.c. of a 1 per cent. solution of arsenious acid in water acidulated with hydrochloric acid. In making a series of estimations it is necessary to repeat the titration from time to time, as loss of strength is continuous.

This method, applied to the determination of the non-saturated acids contained in seven samples of oil from the same variety of olives, prepared during a period extending from the 27th of November, 1885, to the 4th of June, 1886, showed only insignificant differences; the minimum absorption by one gram of oil having been 0·512 gram of bromine, and the maximum absorption 0·522 gram. Comparative experiments with oils from different varieties of olives from the Alpes-Maritimes, Var, and Vaucluse departments, gave absorptions varying between 0·500 gram and 0·544 gram. This latter figure was given by the "Blanquetier" oil, which in this, as in other respects, differed from other olive oils.

The quantity of bromine absorbed by one gram of oils from other sources was as follows:—

	Gram.
Cotton-seed oil	0·645
Sesame oil	0·695
Arachis oil	0·530
Poppy-seed oil	0·835
Colza oil	0·640
Camellia oil	0·817
Linseed oil	1·000

Excepting that which relates to arachis oil, these figures differ notably from those obtained with olive oil. But in these estimations arachis oil could not be confounded with olive oil, because the solution of its soap in the 50 c.c. of alcohol solidifies almost immediately at a temperature of 15° C., whilst that of the soap prepared from olive oil remains limpid.

It may be inferred from the foregoing that the most constant character of olive oil prepared in the laboratory is its density. The absorption of bromine by the fat acids of the saponified oil, which is nearly constant for the same variety of olives gathered at widely separated periods, and presents a variation of about 9 per cent. in the kinds studied, can be utilized to distinguish varieties of olive oil (at least those of the south-east of France) from cotton-seed, sesame, poppy-seed, colza, camellia and linseed oils. Arachis oil is recognized easily by the solidification of its soap.

* *Comptes Rendus*, civ., 371.

The Pharmaceutical Journal.

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Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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AN AMERICAN VIEW OF THE FUTURE OF PHARMACY.

THE opening of the various colleges of pharmacy in the United States last month has been celebrated, as is usual on such occasions, by the delivery of valedictory addresses, in which the graduates are congratulated on the successful termination of their studies, and offered some parting advice concerning their future conduct in the occupation they are entering upon. Several of these addresses have been published in the American pharmaceutical journals, and while they are generally well worth perusal, there is one, delivered by Professor C. O. CURTMAN, at the St. Louis College of Pharmacy, which is particularly worth referring to, because it deals with various matters of what may be called trade interest, which are also at the present time attracting considerable attention on this side of the Atlantic. It may be gathered from the tenour of this address that some of the difficulties and perplexities encountered here by those engaged in the drug trade have also made themselves sensible among our American brethren, and that the question how to make a living by the practice of pharmacy has there, as well as here, become one of urgency in the present, and of doubt as to the future. In a general way the practical conditions under which business is carried on in both cases do not appear to differ very materially, though there is one marked characteristic referred to by Professor CURTMAN, as applying to the future pharmaceutical practitioners in America, which does not obtain as yet with us, viz., systematic education. Hence, in addressing the graduates of the St. Louis College of Pharmacy, on entering the ranks of the profession they had chosen, he was enabled to speak of them as having been invested with all the rights and privileges a careful collegiate education could bestow, and as having had the seal set upon their proficiency after years of studious application and careful training. In other respects, however, the pinch of competition appears to have been felt as keenly in America as it has been here, and the decay of trade resources resulting from alteration of habits and opinions seems to have been no less pre-judicial. For this reason Professor CURTMAN was induced to abstain from the attempt to depict to the graduates in the rosiest hues the brilliant prospects of a pharmaceutical career, the high esteem and the great rewards in store for them in acknowledgment of their conscientious zeal, and in place of such encouragement to substitute as more advantageous a glimpse at less flattering realities and a warning against immoderate expectations or delusive hopes.

As to the condition of the business upon which the graduates were entering, the account given is that on all sides complaints, sometimes loud and bitter, are to be heard of dull times, falling off in the anticipated profits of legitimate business and energetic denunciations of the agencies supposed to be the cause of the widespread discontent. The results of the last few years appear to have been generally unsatisfactory. While all agree that the prescription business is considerably less than in former times, the main falling off has taken place in the sale of those articles which are neither drugs nor medicines, though they have for some time past formed no inconsiderable portion of the stock in trade of the druggist. Patent medicines, once in favour and commanding a ready sale, either cumber the shelves as out of date, or if still in demand have been brought down by competition to prices that render the profits insignificant. Articles of "elegant pharmacy," from which so much was expected, after the short-lived spurt following the visits of travellers to physicians, have in time given place to the last new thing and become almost absolutely unsaleable. Toilet articles, perfumery, and the manifold sundries which so long adorned the show cases of drug stores are no longer sought for there by purchasers, but have been almost entirely monopolized by the dry goods stores. The complaints thus formulated in reference to the state of the trade in America constitute almost an echo of what is constantly heard at home, and this fact gives especial interest to the expression of opinion as to any feasible means of providing a remedy for a state of things so discouraging. It is in this respect that the address we have referred to appears to have unusual importance. There is no indication in it that those who suffer more or less from the untoward influences of the present should fold their hands in listless inactivity to watch for the fulfilment of the gloomy prophecy that pharmacy is gradually but irrevocably doomed to extinction, and in examining the various and often conflicting counsels that are offered there is at the same time an evident recognition of the necessity for keeping in view the essential features and requirements of pharmaceutical work. Hence the proposal to extend the catalogue of an already almost endless array of "side shows" to the drug trade is condemned as incompatible with the duties of a pharmacist; more likely to damage his interests by provoking retaliation that may entail still greater loss in lines of trade still held by him

than to be of any permanent benefit. As little favour is shown for legislative enactments by which protective restrictions would be brought to bear, and the Government control by which the practice of pharmacy in some parts of Europe is beneficially regulated is held to be too little in accord with the spirit of American institutions to offer any hope of being applicable. But neither among the proposals that have been offered for improving the existing state of depression in the drug trade of America, nor on the part of the author of the address we are speaking of, is there any sort of suggestion that the educational training of the pharmacist is a qualification that should be dispensed with, or that the necessity of obtaining it is a hardship interfering with his prospects of success in business. On the contrary, it is in virtue of the possession of this advantage, and by the proper application of it, that a prospect is pointed out of effecting an improvement in the conditions of pharmaceutical practice in the future.

In speaking of the change produced in the aspects of pharmaceutical practice by the manufacture on a large scale of preparations that were formerly produced in the laboratory of the individual drug store, a decided opinion is expressed that this system has been carried too far. As regards certain chemicals, it may be justified on several grounds, but not as to galenical preparations used in dispensing physicians' prescriptions, still less for ready made pills, fluid mixtures, emulsions, and ointments, tending to substitute and supplant the extemporaneous prescription entirely, to render any knowledge of compounding superfluous and to reduce the occupation of the pharmacist to one of merely retailing ready made goods. It is in opposition to such tendencies that the skilful and competent pharmacist must bring to bear the knowledge that he possesses and takes advantage of the opportunity he has of convincing physicians that he is competent to manufacture extracts and similar articles of so satisfactory a quality that there is no need of specifying in prescriptions the goods of firms with whom the prescriber can, in most instances, be acquainted only through their general repute, or by the samples pressed on his notice by active canvassers. As for the ready made medicines of all kinds which are, in fact, the negation of pharmacy, the advice given is to avoid them altogether. In regard to this class of articles, it is the duty of the pharmacist to educate the public to the perception of the truth that for various reasons they are not to be trusted, and to urge physicians to discontinue their use. In this sense Professor CURTMAN appealed to the graduates he was addressing, that, educated as they were, and trained in the processes of the pharmaceutical laboratory, they should never for the sake of indolence or convenience encourage the use of such articles. As to the directions in which their energies might be directed for new applications of their scientific knowledge, many might be pointed out which, according to circumstances, would present themselves to the watchful eye of the well-educated pharmacist, and among these there is one field opened up by the change that has taken place in medical opinions and practice for the occupation of which the present time is especially favourable. This is the chemical examination or analysis of water, unwholesome or adulterated food, and other kinds of chemical inquiry connected with questions of sanitation The demand for such work is likely to increase and offer a prospect for remunerative occupation to pharmacists capable of carrying it out. The trade in special articles of food and drink whose absolute purity renders them necessary accompaniments of the treatment of the sick might, for that reason, be undertaken by the pharmacist, and also because his technical skill would enable him to guarantee their quality and purity. Such business would be much better suited to his acquirements than the trade in fancy soaps, perfumery, stationery, cigars, etc. No uneducated shopkeeper could compete with him here, or deprive him of the advantage of possessing the confidence of physicians and of the public. Once fully prepared and acknowledged to be trustworthy, many investigations, now reluctantly made by the busy physician, would be assigned to the pharmacist and bring him adequate remuneration. It is in this way that Professor CURTMAN suggests that the old title of pharmacist, rendered almost obsolete on account of evident inappropriateness, may be revived, and the designation—chemist and druggist—will have a meaning different from that of a mere labourer in chemicals and drugs. Under such conditions we may hope to see again, as in days of yore, rising from the ranks of pharmacists men whose discoveries in science will shed lustre on their profession, and who will prove to the world that pharmacy is neither dead nor going to die.

We have pleasure in calling attention to the First List of Stewards for the Dinner in aid of the Benevolent Fund to be held on the 17th of May, which appears in another part of this Journal. The list, as a preliminary one, is fairly large, but it may be hoped that the Secretary, Mr. Bremridge, will receive from many other gentleman an intimation of their willingness to become stewards, as it is desirable that the movement should be numerously, as well as influentially, supported, so as to ensure the success it so well deserves. It may be added that the liability of each steward is limited to payment for one dinner ticket.

* * *

The next meeting of the Chemists' Assistants' Association will be held on Wednesday, the 20th inst., when a paper on "The Substitutes for Quinine," by Mr. T. S. Dymond, will be read.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

Wednesday, April 13, 1887.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The last Evening Meeting in London of the session was held on Wednesday, the 13th inst., the chair being taken by the President of the Society at eight o'clock.

The first paper read was on—

THE PHARMACOPŒIAL TEST FOR THE PURITY OF ETHER.

BY PROFESSOR DUNSTAN AND T. S. DYMOND.

The paper is printed on p. 841, and gave rise to the following discussion :—

Mr. THOMAS TYRER expressed his thanks to Professor Dunstan for the explanation of some of the difficulties which manufacturers had encountered. No doubt the extreme care shown by modern pharmacists was to be commended, but it certainly gave manufacturers a great deal of trouble. One of his correspondents had imposed tests for the purity of ether which he (Mr. Tyrer) had from the first declared to be impossible of fulfilment, and he was, therefore, very grateful to Professor Dunstan for having demonstrated that pure ether did liberate traces of iodine when treated with potassium iodide. The further illustration of what might be called the condition of ether as ordinarily sold was also useful, and he had no objection to the imposition of any practicable test, though he protested against hypercriticism on the part of compilers, dispensers and others, and when a test was so delicate that the minutest possible traces of hydrogen peroxide might be developed by it, he thought it would be hardly wise to introduce it into the Pharmacopœia. At the same time, the Pharmacopœia test, particularly as originally described, was now shown to be not only crude, but unreliable. It was this subject which had attracted him that evening, and he might say that his own experience had been to find, after the most careful distillation, nothing which could flatter his scientific ability. He could, at any rate, confirm the first part of Professor Dunstan's statements. He should like him to mention again the precise delicacy of the chromic acid test.

Professor DUNSTAN said it would certainly show the presence of ·02 per cent. of peroxide of hydrogen. The Pharmacopœia test would show a liberation of iodine with the perfectly pure ether.

Dr. PAUL said he made some experiments on this subject when Mr. Warden's paper was first published, owing to some doubts which he entertained as to the accuracy of the statement with regard to the liberation of iodine, having been in the habit of using ether very frequently, together with iodide of potassium, and not having noticed any liberation of iodine. On trying the experiment, even with a strong solution, and exposing it to light he found no liberation of iodine. Only the other day he came across a tube in which a sample of ether had been tested with iodide of potassium which had been standing ever since, and notwithstanding the lapse of time (about eighteen months), and its being exposed to the full sunlight, there had been no liberation of iodine. Following out the subject he had asked Mr. Williams to supply him with some samples of ether, and Mr. Williams sent him some twelve or eighteen different samples. Strange to say, when he came to test them, the highest priced, best, most highly rectified samples all yielded iodine under the test, but the commoner kinds, such as the ordinary methylated ether used for ice making, did not give the slightest trace, even with a strong solution of potassium iodide. It appeared, therefore, that the attempts made to purify ether by rectification or redistillation really developed this iodine-liberating substance.

The PRESIDENT, in proposing a vote of thanks to the authors of the paper, said he sympathized very cordially with manufacturers who were harassed by experimenters possessing a little knowledge, but who were not always so thoroughly versed in experimental work as to be able to follow out the indications of what they thought was an impurity. It was very easy by using many chemical tests, especially those mentioned in the Pharmacopœia and in manuals, to imagine that you had hit upon a great discovery, but it was necessary in the case of all organic bodies like ether, before making any statements as to their purity, that a further examination into the nature of their reactions and the nature of their supposed impurities should be carried out in the manner in which Professor Dunstan and Mr. Dymond had done their work. It was obvious that if the absolute purity of ether were required from manufacturers, it would increase the cost of an important remedial agent, and would be contrary to the interests of the public. Manufacturers were doing all they could to meet the demands for purification within reasonable limits, but to expect absolute purity in all things was about as reasonable as to pass an Act of Parliament that they should all drink distilled water.

The next paper read was on—

THE PHARMACEUTICAL PREPARATIONS OF ATROPA BELLADONNA. PART III.: SUGGESTIONS FOR STANDARDIZED GALENICAL PREPARATIONS.

BY PROFESSOR DUNSTAN AND F. RANSOM.

The paper is printed on p. 843, and gave rise to the following discussion :—

Mr. MARTINDALE said the only preparation the authors had not made, the plaster, was one he should like to have their opinion upon, as it struck him that if they used an extractive which contained less percentage of alkaloid, and more of the extractive substances, it would make a less adhesive plaster. The amount of common gummy extractive which might be taken up with a weak spirit would make an extract which, as shown by the table, could be less rich in alkaloid, but would add to the bulk of the plaster without increasing its adhesiveness. Another point which occurred to him was whether, from an economical point of view, it would be wise to use the belladonna root for manufacturing ; whether it was not a little extravagant to dig up the roots and use them rather than to allow them to grow a crop of leaves year after year.

Mr. GERRARD thought there might be an objection to the presence of sugar of milk when used for the preparation of belladonna plaster. It would be quite insoluble in the other ingredients, and he had little doubt but that the powdered sugar of milk, being of greater density than the plaster itself, would, in the act of spreading, fall to the bottom of the plaster-spreading machine, so that the first portion of the plaster would receive a coating containing a large quantity of sugar of milk whilst the end would contain the largest quantity of extractive. He did not speak positively, but that was an objection which he thought might occur. He was pleased to hear that Mr. Ransom had obtained a larger yield by using weaker alcohol than rectified spirit, and he knew from his own experience that it gave a much larger yield of extractive. From what he understood of the process, the authors employed two chloroformic extractions, and he should like to know if, by this means, they got the alkaloid in a nearly colourless state, or whether it was nearly brown. It was his experience, in extracting atropine by means of chloroform, that the result was more or less brownish, and he preferred ether as the final solvent. It was not quite so powerful a solvent as chloroform, but it yielded the atropine in a much purer state.

Professor DUNSTAN then drew attention to some points brought out by the table of results, which showed the rectified spirit of the Pharmacopœia extracted a very small quantity of alkaloid from the root. Up to a certain point a diluted spirit was a better solvent than

rectified spirit alone, and that went on up to twenty-five volumes of water to a hundred of spirit. When that proportion was exceeded, the amount of alkaloid extracted again diminished, until, when an equal volume of water and spirit was used, the same amount only was extracted as by rectified spirit alone. Another column showed the fallacy of depending on the amount of extract as a test of the strength of the tincture. The amount of extract obtained was proportional to the amount of water used. He drew on the blackboard a curve, showing the gradual rise and diminution in the amounts of alkaloids extracted, according to the percentage of water added to the spirit, and then added another curve showing the yield of extractive, by which it appeared that the more water there was added the larger quantity of extract was obtained. Another remarkable point, which he intended to work out further, was the similar results yielded by different powdered drugs. Taking nux vomica, although the salts were entirely different chemically from those present in belladonna root, and were soluble to a different extent in alcohol and water, yet the curve which explained the action of alcohol and water on powdered nux vomica had almost exactly the same form. That pointed to there being some constant feature in the process, and he believed it might be connected with the fineness of the powder. When you packed a percolator with very fine powder and attempted to exhaust it with spirit and water, upon the amount of water reaching a certain point it began to cause clogging, which corresponded to the diminished yield of alkaloid. But whatever the explanation might be it was remarkable that two such different substances as belladonna and nux vomica presented a percolation curve almost precisely similar. He was anxious to learn from any practical pharmacist whether there was any objection to using sugar of milk in the extract of belladonna. There would be no doubt a great gain as far as uniformity was concerned, and he wished to know whether it would interfere in any way with the uses of the extract. As far as he could see it would not.

Mr. MARTINDALE said sugar of milk had been used in America in a number of eclectic remedies when it was found that certain resinous bodies were so soft that they could not be powdered in order to bring them to a solid condition. He was inclined to think that sugar of milk would be for practical purposes about the best substance which could be used. The present extract of nux vomica was in a difficult condition to keep for making pills, if it were of the standardized strength, and probably the use of sugar of milk might be of service, though at present the addition of it would render a person liable to a conviction under the Sale of Food and Drugs Act. On the Continent, and in this country, extracts were produced in a desiccated condition, but there was this disadvantage, that they were very hygroscopic, and as soon as the jars were opened they absorbed moisture to such an extent that they became very inconvenient to dispense.

Mr. ALLEN did not think Mr. Gerrard's objection with regard to plaster-spreading would apply to ordinary dispensing. The great object was not to have the plaster in too liquid a form, and he could not see how the presence of a little finely-powdered sugar of milk could interfere with a good result. He had no experience in plaster-spreading by machine, but probably for that purpose the plaster had to be in an almost liquid condition. That, however, was not the condition in which a dispenser would use an extract in spreading a plaster.

Mr. MACEWAN remarked that the abstracts of the U. S. Pharmacopœia were diluted with sugar of milk. They were dry extracts brought up to a certain strength by the addition of this substance.

The PRESIDENT said this was perfectly well known. The point on which Professor Dunstan desired information was whether any objection had been found to the use of sugar of milk in such things as abstracts, or to any extracts being mixed with sugar of milk.

Professor DUNSTAN said when his paper on nux vomica was read it was suggested that such an admixture should be adopted, but one eminent pharmacist said he should not like to countenance mixing anything with an extract; nevertheless he (Professor Dunstan) did not see why, if uniformity could be thereby attained, this should not be done, provided there were no therapeutical objections.

Mr. PICKARD, as a practical pharmacist, thought there would be certain objections to the root for making the tincture. At present there were two preparations differing very widely both in strength and appearance. It was certainly a great desideratum that the dispenser should be able to ensure uniformity.

Mr. BOWEN said that having found standardized extract of nux vomica rather too thin for dispensing purposes, and of course liable to lose weight and become thicker, simply by the evaporation of the spirit left in it, he had dried the extract and diluted it to the proper strength with sugar of milk, and he found this most satisfactory. There was no reason against doing so that he knew of; he had kept it for some months and found it the most convenient form in which to have extract of nux vomica.

Professor DUNSTAN remarked that the only objection to Mr. Bowen's plan was that he rendered himself liable to a prosecution under the Adulteration Act. If the nux vomica were carefully selected there was no difficulty in getting specimens which would yield a thicker extract. The only objection to the keeping properties of nux vomica extract made from good specimens was that it was liable to absorb a little water. There were only a few specimens of the seeds which gave an exceedingly fluid extract.

Mr. BUTT said the question of liability to prosecution was very important, but he thought if the extract were of standard strength there was nothing to fear from an inert substance being added.

Mr. RANSOM, in reply to Mr. Martindale's observation, said it had been found that belladonna roots which had yielded several crops of leaves were not worth using. They were employed now, but for a standard preparation such as was contemplated they would be of no use whatever. Old roots contained a very small proportion of alkaloid. It was not likely this would supersede the old green extract, for which leaves would continue to be used. As a matter of fact much the largest proportion of roots used was imported from Germany, the small German roots being much richer in alkaloid than the English. In answer to Mr. Gerrard he would say that the residue was nearly colourless if the chloroform were allowed to evaporate spontaneously; if dried at 100° C. it became somewhat brownish, but it had been proved by examination that practically no change takes place.

The PRESIDENT, in proposing a vote of thanks to the authors of this paper, said at present medical practitioners were divided into two schools—those who believed in drugs, and those who did not. Those who did believe in them believed in using them unflinchingly and with courage; but to achieve all that a drug was capable of, it was necessary that the pharmacist should supply a preparation on which the doctor could absolutely rely. Therapeutics could not be advanced unless the pharmacist could put before the physician and experimenter a definite preparation, representing as nearly as possible the conditions in which the alkaloidal constituents existed in the natural root. These preparations seemed to point to the right way of meeting this requirement. It would be a distinct advance in practical pharmacy when preparations of nearly all the more potent drugs were prepared in a condition such as was shown in these specimens, containing a definite quantity of alkaloid, and in a condition as nearly as possible like that in which they existed in the root itself. Their thanks were not only due for this

particular paper, but for the work which was being done on this important subject of standardizing all such preparations.

A paper was then read entitled—

HUECHYS SANGUINEA: DOES IT VESICATE?

BY JOHN MOSS, F.I.C, F.C.S.

The paper is printed at p. 845.

A vote of thanks to the author was passed.

The CURATOR called attention to some specimens of Linimentum terebinthinæ upon the table, which had been sent since the paper on the subject was read. One of these, prepared by Mr. J. Bland, in which the Pharmacopœia instructions as to the quantities and character of the ingredients had been followed, was quite transparent, and formed an elegant preparation; another, in which proof spirit had been used instead of water, also formed a clear liquid, but rather thinner than the last. He also showed a specimen of the green olive oil, presented by the Chiswick Soap Company, and used for the manufacture of the green soft soap. As contrasted with a specimen of olive oil prepared in South Australia, and presumably pure, the colour was so different and so unlike in tint the pale greenish tint of some specimens of virgin olive oil, that he could hardly believe that the colour was natural. In justice to the firm who presented it, he must, however, remark that the oil tasted as pure as the olive oil used for salads and it was evidently purchased with full confidence in its purity. Possibly some of the members present might have seen and examined olive oil of a similar dark green colour. Among the specimens of Chinese drugs on the table, there was a specimen of hemp-seed oil, which did not possess a green colour, and judging from it, it seemed hardly likely, as had been suggested at the last meeting, that the use of hemp-seed oil was the cause of the green colour of some specimens of soft soap, unless indeed the oil became greener under the action of alkalies.

The PRESIDENT said at the last meeting Professor Redwood laid some stress on the question of the kind of soap to be used, and, of course, from that one naturally reverted to the olive oil.

Mr. BRAITHWAITE said within the last fortnight he had had occasion to examine a sample of olive oil very similar in colour to that now shown, but he was not at present aware of its source. In the ash he found considerably more than chemical traces of copper, and, at the same time, he examined a sample of green soft soap, the ash of which also gave indications of so much copper that he thought one was warranted in the conclusion that copper was present not as an accidental impurity. At the same time he examined a sample of yellow soft soap, which gave no such indication.

Dr. PAUL said there was a solution of chlorophyll in oil prepared and sold for certain purposes, whether it was for colouring olive oil or not he could not say, but the colour of this sample was very different from anything likely to be produced even from green olives. Olive oil was generally made from what were called "black olives," the colour of which was a brown rather than green. This sample had more the appearance of chlorophyll green.

The CHAIRMAN asked if Mr. Braithwaite had tried to colour olive oil with a salt of copper.

Mr. WILL said if olive oil were boiled in a copper vessel it would become green after a short time.

Mr. BRAITHWAITE said he had merely had time to detect the presence of copper in the oil. He had not made any further experiments at present, but Mr. Holmes had promised him a sample of this oil, which he would examine.

Professor DUNSTAN suggested that the oil should be examined by the spectroscope, which would at once indicate the presence of chlorophyll by the absorption band.

The PRESIDENT said that would not show whether the chlorophyll were present naturally, or had been added afterwards.

The CURATOR remarked that the green olive oil when shaken up with alcohol yielded hardly any colour to that solvent, and when ammonia was added to the alcoholic liquid, no blue colour was developed, from which he inferred that neither chlorophyll nor copper was the colouring matter of the oil, if any were employed.

The CURATOR then explained the modes of using the Chinese oil seed presses, of the still used for preparing menthol and oil of peppermint, and of the mill used for grinding cosmetics. These models, together with the very interesting collection of Chinese oil seeds and other drugs, had been presented by Messrs. A. S. Watson and Co., of Hong Kong, and it was unfortunate that their London representative, Mr. Talbot, was unable to be present to throw some light on the uses of some of these interesting products. One of the oils and accompanying oil seeds were labelled Chaulmugra, but did not consist of the true Chaulmugra—but of that which appears to be known under that name in China (judging from Dr. Porter Smith's specimens and descriptions on p. 140 of his work on Chinese materia medica), the seeds being those of *Gynocardia antisyphilitica*, Pierre, known in Siam and Singapore as Luceraban seeds. Attention was next directed to a valuable and interesting series of all the Ledger barks cultivated in Java, and to a collection of herbarium specimens of the trees yielding the Tengkawang fats of Sumatra and Borneo, together with specimens of the fats yielded by the seeds; also of a similar collection of the more valuable of the gutta-percha yielding plants of those islands. It was interesting to note that some of the seeds of these trees also yielded fatty substances, specimens of which accompanied the herbarium specimens. With one or two exceptions these trees all belonged to new species recently described by Dr. Burck, and were therefore especially valuable, since they had been presented by him. The Curator said he had learned from Dr. Burck that the best of the gutta-percha trees were already under cultivation in Java. The Dutch Government, with the commendable promptitude which characterized its action in the matter of Cinchona cultivation, has thus set an example which the English Government would do well to follow, since the gutta-percha trees are at present recklessly destroyed and are of very slow growth. The Curator further directed attention to fresh specimens of Bael fruit, presented by Mr. P. W. Squire; a series of the commercial varieties of turmeric, presented by Messrs. Hale and Son, to a specimen of Strophanthin, presented by Messrs. Burroughs and Wellcome; and to a specimen of Umkuhla oil from Natal, presented by Mr. J. Medley Wood, Curator of the Botanic Gardens at Durban, Natal. This oil had been sent in sufficient quantity for experiment. Mr. T. B. Groves, who had some months since examined the oil, believed that it would probably be found serviceable for use in medicine.

PRELIMINARY EXAMINATION.

Tuesday, April 12.

The following are the questions set for the Preliminary examination on Tuesday last:—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. (*For all Candidates.*) *Translate into Latin*:—

1. The king's daughter fears war.
2. The inhabitants of the town were selling corn to the sailors.
3. Javelins have been thrown by the foot-soldiers into the camp.
4. Which horse of the two has my brother bought?
5. Word was brought to Cæsar that the soldiers were running together to arms.

II. Translate into English, and answer Grammatical Questions on either A. (Cæsar) or B. (Virgil.)

(*Candidates must not attempt both authors.*)

A. CÆSAR.

1. Boios, petentibus Æduis, quod egregia virtute erant cogniti, ut in finibus suis collocarent, *concessit*; quibus illi agros *dederunt*, quosque postea in parem juris libertatisque conditionem, atque ipsi erant, receperunt. In castris Helvetiorum tabulæ repertæ sunt, litteris Græcis confectæ, et ad Cæsarem relatæ, quibus in tabulis nominatim ratio *confecta erat*, qui numerus domo *exisset* eorum, qui arma ferre possent: et item separatim pueri, senes, mulieresque.

2. Quum tridui viam processisset, nuntiatum est ei Ariovistum cum suis omnibus copiis ad occupandum Vesontionem, quod est oppidum maximum Sequanorum, contendere, triduique viam a suis finibus profecisse. Id ne accideret, magno opere sibi præcavendum Cæsar existimabat. Namque omnium rerum, quæ ad bellum usui erant, summa erat in eo oppido facultas; idque natura loci sic muniebatur, ut magnam ad ducendum bellum daret facultatem, propterea quod flumen Alduas-dubis ut circino circumductum pœne totum oppidum cingit.

Grammatical Questions.

(For those Candidates only who take Cæsar.)

1. Decline in full *finibus suis*, and *qui numerus* (Par. 1).
2. Write in full the indicative present and subjunctive perfect of the verbs in italics (Par. 1).
3. Parse *tridui*, *occupandum*, *profecisse* (Par. 2).
4. What is meant by a *deponent* verb? Write out the participles of any two deponent verbs.

B. VIRGIL.

1. Est in secessu longo locus: insula portum
Efficit objectu laterum, quibus omnis ab alto
Frangitur inque sinus scindit sese unda reductos.
Hinc atque hinc vastæ rupes geminique *minantur*
In cœlum scopuli, quorum sub vertice late
Æquora tuta silent: tum silvis scena coruscis
Desuper, horrentique atrum nemus *imminet* umbra.

2. Jura dabat legesque viris, operumque laborem
Partibus æquabat justis, aut sorte trahebat:
Quum subito Æneas concursu accedere magno
Anthea Sergestumque videt, fortemque Cloanthum,
Teucrorumque alios, ater quos æquore turbo
Dispulerat, penitusque alias avexerat oras.
Obstupuit simul ipse, simul percussus Achates
Lætitiaque metuque: avidi conjungere dextras
Ardebant; sed res animos incognita turbat.

Grammatical Questions.

(For those Candidates only who take Virgil.)

1. Decline in full *vastæ rupes*, *atrum nemus* (Par. 1).
2. Write in full the indicative present and subjunctive perfect of the verbs in italics (Par. 1).
3. Parse *viris*, *sorte*, *oras*, *percussus*.
4. What is meant by a *deponent* verb? Write out the participles of any two deponent verbs.

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*)

1. A postman, whose pay for a week is 15*s.*, is fined 1*s.* 6*d.* if he comes in late, and at the end of 13 weeks he receives £8 15*s.* 6*d.* How often was he late?

2. If the product of $\frac{7}{8}$ and $2\frac{1}{4}$ be added to the sum of $21\frac{5}{7}$ and $3\frac{6}{11}$, by how much will the result differ from 100?

3. Reduce £4 17*s.* 3½*d.* to the decimal of a guinea.

4. Find the cost of papering a room 37 feet 3 inches long, 18 feet 4 inches wide, and 14 feet high, with paper 2 feet 4 inches wide, at 6*d.* per yard.

5. If 15 men can do a certain quantity of work in $12\frac{3}{8}$ days of $9\frac{4}{5}$ hours each, how many days of 11 hours each will 9 men require to do $4\frac{4}{7}$ times as much work?

6. Give the English equivalents of the *litre* and *gramme*. If a sack of corn containing 1 hectolitre 20 litres cost 15*s*, what ought to be paid for a sack of corn containing 3 hectolitres 20 litres?

7. If $5\frac{1}{2}$ per cent. would be gained by selling 121 lbs. for £26 11*s.* $10\frac{3}{4}$*d.*, at what price per lb. must it be sold to gain 12 per cent.?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

1. What is meant by Adverbial and Adjectival Clauses in sentences? Give one example of each.

2. Analyse the following sentence:—"If anger is not restrained, it is frequently more hurtful to us than the injury which provokes it."

3. Parse the following sentence:—

"Sundry blessings hang about his throne,
That speak him full of grace."

4. In the following passage supply the necessary capital letters, and put in the stops and inverted commas where necessary:—he sent for shrewsbury and again spoke earnestly about the secretaryship shrewsbury again excused himself his health he said was bad that said william is not your only reason no sir said shrewsbury it is not and he began to speak of public grievances and alluded to the fate of the triennial bill which he had himself introduced but william cut him short there is another reason behind when did you see montgomery last shrewsbury was thunderstruck.

5.* Write a short composition on *one* of the following subjects:—

(i.) The Reign of Queen Victoria.
(ii.) The present Condition of Ireland.
(iii.) The Advantages of the Metric System.
(iv.) Presence of Mind.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday the 6th instant, at the Society's rooms, No. 11, Harcourt Street, Dublin.

The Vice-President, Mr. H. Draper, took the chair, the President, Mr. Allen, being in attendance at examinations going on in another part of the building.

The other members of the Council present were Messrs. Begg, Grindley, Brunker, M.A., Doran, Wells, Hayes, Dr. Evans, Sir George Owens, M.D., Dr. Montgomery, Dr. Collins and Professor Tichborne.

A letter from Mr. Joseph Calvert, of Lurgan, a licentiate of the Society, suggested that members should be allowed to decide for themselves which of the journals they would take, or that at all events that privilege should be allowed to members joining from henceforward. The writer submitted that it was arbitrary to force a particular journal on members.

Mr. Wells: I think the answer to be given to that is, that the Council have already considered the matter and arrived at a decision upon it, and that they see no reason to depart from that decision.

A letter from Mr. McNaught, Secretary to the Belfast Chemists' Association, was read asking the Council to appoint Mr. A. J. Lewis, of Royal Avenue, Belfast, Solicitor, as the local representative to whom the Council were to forward instructions in legal matters, instead of Mr. Harper.

The Vice-President: We have no power to appoint a solicitor.

Dr. Doran: It lies with themselves.

Mr. Brunker: All that was done by this Council on a former occasion was to approve of a suggestion that Mr. Harper should be appointed by the local association.

The Vice-President: Why did we undertake to exercise such a power of approval?

* This must be attempted by every Candidate.

Mr. Brunker: Because it was necessary, where the name of this Society was to be used in prosecutions, that the solicitor should receive instructions from us and should have power to act. On the suggestion, therefore, of our Local Committee, Mr. Harper was approved of as the local solicitor. But these gentlemen know their own business best. If they think they can do better by changing their solicitor we ought not to make any objection.

Professor Tichborne: I was not aware that we were in communication with the Belfast Chemists' Association. I thought it was a Local Committee of members of the Society.

Mr. Brunker: They are an association who have formed themselves for defence and improvement, and have been for some time in existence in Belfast.

The Vice-President: I suppose Mr. Ferrall should be instructed to write to their secretary stating that we have sufficient confidence in them to sanction the appointment of any solicitor approved of by them.

Mr. Brunker: It should be understood that the gentleman is not an officer of this Society. This matter was very carefully attended to in the first instance. It should be intimated to this local association that the gentleman whom they have selected as their solicitor can be appointed on the same terms as his predecessor.

Professor Tichborne: I should be inclined to refer that letter to our Local Committee.

Mr. Brunker, pursuant to notice, moved the following resolution:—

"That any candidate who presents himself for examination, and who shall receive an examination paper in due course from an examiner, shall be regarded as a rejected candidate if he does not attend the examination throughout."

He had given notice of this resolution in consequence of the communication which the Council had had under consideration from Mr. Lyons. It was only right that gentlemen about to go in for examinations should make up their minds as to whether they knew their business or not. When once they came in to the examination they should go through with it. As matters stood at present, the Council were liable to have their time taken up with letters from candidates who had attended part of an examination, and then retired asking for special consideration. It would be far better to have a hard and fast rule laid down. Besides it was hard on the examiners that gentlemen should be allowed to act in this jack-in-the-box way. One of the results of having acceded to the application of Mr. Lyons, was that only one of the examiners in his case was paid, while the other two were not. The examiners were entitled to be paid for every candidate whose name appeared in the list. The practice which his motion proposed to establish was followed by every other examining body.

Dr. Collins said if a candidate asked for a special examination he would have a right to pay. But the Council had never been asked to give special examinations; and when a man came in on a quarterly examination day it was a different thing, because the examiners had to be there to examine the other candidates. At the Apothecaries' Hall quarterly examinations, they would not charge a man if he retired; and at the stated examinations of the College of Surgeons and the College of Physicians, he did not think that if a man asked to retire he would be charged either.

Sir George Owens: They forfeit a certain amount if they retire.

Mr. Wells: I second Mr. Brunker's motion. The reason for it is not so much a question of expense as to put an end to a practice of gentlemen going through a part of an examination and then disappearing, and afterwards applying to be allowed to go in for examination again at the end of three months. According to the rules a man who has been rejected cannot go in for six months afterwards. We lately granted two special permissions of the kind I state, but we gave the last on the understanding that a rule would be brought forward to prevent it.

Mr. Doran: If a man puts down his name and goes in to the examination, but finding the questions too stiff for him retires, he has no right to be excused from paying his fee on that account. It would be very unfair to the examiners if he were.

The resolution was put and carried *nem. con.*

Mr. Brunker moved:—

"That with a view to proper supervision one member of the Council at least should always be present during examinations; and that the members of Council shall undertake this duty in rotation."

This proposal, if carried out, would only amount to an extension of a system adopted by the Society some years ago. A small committee was then appointed to attend the examinations; but it was found very hard to get the members of it to do so; and the result was that the duty came to be thrown upon two or three. It was only right that, where such a responsibility was assumed, the performance of the duty should be divided as far as possible. At the last annual meeting of the Society the Committee to which he referred was not reappointed. Numerous letters had appeared in the periodicals finding fault with examiners, and with the mode of conducting examinations: and this it was which made it absolutely necessary that some member of the Council should be always present at examinations, for then he would be able to say afterwards whether a particular thing occurred or not, in the event of any statement being made. If the duty were divided amongst the twenty-one members of the Council, it would not come very heavy upon anyone where there were only four examinations in the year.

Mr. Grindley seconded the motion.

Dr. Montgomery said the duty of the member of the Council attending the examination should be defined. There was a Government Visitor already, and the two might come into collision. At present he (Dr. Montgomery) did not see his way to approving of this proposal. Difficulties might crop up. If their visitor was to be merely a nonentity there would be no use in his attending the examination at all. If he were to be there he should perform a duty.

The Vice-President: There should be some member of the Council at the examinations to prevent the possibility of candidates copying or borrowing from one another. There is no intention whatever to interfere with the Government Assessor.

Dr. Montgomery said he did not think the proposed position would be a proper one for a member of the Council to be in. He would be a sort of spy.

Sir George Owens said he differed totally from Dr. Montgomery. He thought Mr. Brunker's resolution would be a most useful one. The gentleman would have nothing to do with the conduct of the examinations, but he would be in a position to report to the Council what took place at them. The Government Visitor might not always be present.

Dr. Evans: Is it expected that whoever goes should remain there all day? I could not spend that length of time. Also I would ask how long does the Government Visitor stay? Is he in and out, or does he stay the whole time the examination lasts?

Mr. Brunker said there would be nothing to prevent a day's examination being divided between three or four members of the Council. He did not propose that they should in any way interfere with the examination. They should simply be there to know what was going on.

Dr. Collins said it appeared to him that the passing of this resolution meant that there would devolve upon members of the Council a duty which the Government Visitor was paid for doing. There could be no objection to any member of the Council going in to an examination for a while; but it would be unreasonable to expect a gentleman to spend his whole day there.

Mr. Brunker: The function of the Government Visitor is not to be present during the entire examination, but to report on what he observes. It was never intended that he was to be present during the whole three days.

Dr. Montgomery: When the question was discussed originally, I think we took a very different view of it from that. Is it understood that the Government Visitor is not to be here during the entire examination; or for what time is it expected that he shall be here?

Mr. Hayes: Can any member inform us whether the Inspector of the examinations of the English Society is there during the whole examination?

Professor Tichborne said it would be very desirable if they could induce more visiting of examinations on the part of members of the Council; at the same time he thought Mr. Brunker's resolution was worded in an arbitrary manner and was impracticable. A good many members could not afford to spend a whole day at an examination; and, besides, the resolution asked that members of the Council, who were not paid, should do what the Government Visitor was paid for doing.

Mr. Brunker said that while the Committee to which he had referred existed the Registrar used to write to the members of it, and Dr. Collins, Dr. Montgomery and Mr. Allen used to attend the examinations.

The Vice-President: I believe Mr. Allen still does so very conscientiously.

Mr. Brunker: I want simply to extend the number of gentlemen liable to visit.

The Vice-President: Take the word "always" out of your motion.

Mr. Brunker agreed to do so. Each day of examination could be divided between six or seven members.

Dr. Montgomery said he would move an amendment that the consideration of the subject be deferred.

The Vice-President, however, put the motion, which was carried by a majority.

Mr. Brunker then moved—

"That the regulations laid down for attendance on a course of practical chemistry be amended as follows: (*a*) For 'such other schools as may be approved by the Council' read 'Such other approved schools as may, from time to time, be added to the list by this Council.'"

It involved a certain amount of hardship that young men who had worked at well-known schools of practical chemistry had not been allowed to present certificates from those schools, while other schools on exactly the same footing were included in the list of schools from which certificates were accepted. His object now was to alter the existing regulation, so that when a candidate who had worked at a well-known school not on the list came up, the Council would have power to accept a certificate from that school without previously submitting the name of it to the Privy Council. The proposal was, no doubt, only to meet exceptional cases, because they had already on their list all the schools of any standing at present in Ireland. But they all knew that well-qualified young men from England and Scotland came over here as students with the object of taking out the Society's licence, and it was to meet their cases that he proposed the resolution. When approved of by the Privy Council it would give the Council the requisite power in the matter.

Dr. Evans seconded the motion, which was unanimously agreed to.

Mr. Brunker moved the adoption of another alteration in the regulations, viz., — (*b*) For the words "been present at at least three-fourths of the working days of said course," read "actually worked at the bench for one hundred hours during said course." He had had this proposal before his mind for some years. The resolution which was passed in January, 1879, introducing the principle of the curriculum of the English Society, for which a Bill had passed through the House of Lords and had been read a second time in the House of Commons, was tentative and afforded promise of working well; but at the time it was passed he was not aware how little it actually required. But acting since on the Committee for the investigation of certificates brought up by candidates, he had seen, and painfully seen in many cases, that the resolution was little more than a farce. It was at present actually possible for a gentleman to obtain the certificate which the Council required after having worked for only twenty-eight hours at practical chemistry. How far would that carry a student in practical analysis? He wanted to lay down a minimum of hours, which would be some guarantee that a young man knew how to handle a test tube. At the College of Science he used himself to work sometimes for six hours a day, while the usual period of work there was four or five hours a day. He believed that in some of the schools now they put in from one and a half to two hours a day, and in others more; but he had ascertained, by asking questions, that it was actually possible to obtain a certificate after having put in three hours a week for thirteen weeks.

Mr. Wells seconded the motion.

The Vice-President: Your hundred hours would be about two hours a day for two months.

Professor Tichborne said there were two things involved in this proposal. One was the substitution of a given time for days. That was a very good suggestion. There was, however, a great objection to the continual changing of these regulations. The next point was that Mr. Brunker wanted to treble the minimum time of practical study. They would not be able to get the students to put in an exact time; they must give a little law. It had been laid down that the minimum should be three-fourths of a three months' course. That meant thirty-six days. A minimum of twenty-seven days at two hours a day would give fifty-four hours. In the school he was connected with the time of attendance was generally an hour and a half. It would not do to make the daily time too long, for many of the students were in situations. Pharmaceutical students had to come to towns like Dublin, Belfast, and Cork, and remain in them in order to study practical chemistry; and it would be a very serious matter to lengthen the time during which they had to stay. If there were any great increase in the number of students it might be desirable to put on a screw of that kind; but, as a matter of fact, young men were not coming to the profession. They should not be deceived by the number of names in that day's lists. There were thirteen gentlemen in for the licence. That represented £65; out of which £19 10*s*. was paid, leaving £45 10*s*. But eight candidates were in for re-examination; so that the examination would only bring the Society in £5 10*s*. Therefore, obstacles should not be thrown in the way of young men coming up from the country to qualify. No doubt it was very important that they should pay due attention to practical chemistry; but they had other things to study besides. What appeared to him to be a weak point in the existing system of training, was that young men were invited to commence making chemical analyses at a bench before they were instructed in theoretical chemistry. In the medical schools the students had to put in five months at theoretical, and afterwards three months at practical chemistry. He would reverse that and make it three months at theoretical, and three months at practical chemistry. He would suggest that Mr. Brunker should reduce his minimum to sixty hours. He (Professor Tichborne) knew that young men from the school he was connected with attended three or four times as often as they got credit for in the certificates which they produced.

The President (Mr. Allen) here took the chair.

Dr. Collins said that according to the amended regulations of the Apothecaries' Hall, the student was obliged to pass an examination in theoretical chemistry before he was allowed in to the one in practical chemistry.

The Vice-President said the question raised by Mr. Brunker was—could any student learn practical chemistry in thirty-nine hours' work? He (the Vice-President) believed it to be utterly impossible that any student could. Two hours a day spread over three months would not be too much to expect.

Mr. Hayes said that between twenty-five and thirty years ago he attended night lectures in practical chemistry under Professor Galloway, and he still felt the advantage of them. It would be impracticable to get an attendance of one hundred hours in three months. Three nights in the week of two hours each would be enough; and making a deduction for unavoidable absence the maximum might be seventy-eight, and the minimum sixty hours. He quite agreed with Professor Tichborne as to the necessity of theoretical instruction. Professor Galloway used to give an hour to theoretical teaching and an hour to the bench.

The President said that such a knowledge of practical chemistry as was necessary for the pharmaceutical student could be very imperfectly acquired even in one hundred hours.

Mr. Hayes: I think double the number of hours that are at present required ought to be enough.

Mr. Wells: At present most of our candidates are plucked in practical chemistry.

Here several members of the Council left.

Mr. Brunker said the subject was a very important one, and he regretted that gentlemen had run away. Those who had been opposing him, had looked rather to the convenience of the candidates than to their efficiency. He did not hold himself bound to a period of three months, but he did want an adequate number of hours at practical work.

The President: I think it a pity that Mr. Brunker should drop the subject.

Professor Tichborne: Do you intend the hundred hours to be a maximum or a minimum?

Mr. Brunker: A minimum.

Mr. Wells: The men from Be'fast know their chemistry, because the schools there are open every night in the week, and they are taught their chemistry.

Mr. Brunker said he would adjourn his motion.

The following gentlemen were elected:—Mr. F. W. Hatton, 53, Lower Sackville Street, Dublin, proposed by Professor Tichborne, and seconded by Mr. Hayes; and Mr. Thomas White, 8, West Beach, Queenstown, proposed by the President, and seconded by Mr. Doran.

The Council then adjourned.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At the meeting of the Chemists' Assistants' Association, on Wednesday, April 6, Mr. T. S. Dymond, Vice-President, in the chair, the following paper was read:—

The Analysis of Urine.

BY J. E. SAUL.

Next to the manufacture and examination of drugs and galenicals—in other words, the practical application of his knowledge of pharmaceutical chemistry—there is no part of this, his chief science, so important to the pharmacist as the subject which forms the *raison d'être* of this paper. Scanning the whole wide range of analysis—gas, mineral and technical; food, waters, and manures; physiological and toxicological—we fail to find a single department of the art more deserving of cultivation by the pharmacist, or for which his special previous training more completely fits him.

The educated pharmaceutical chemist exists for the purpose of relieving the physician of many irksome practical details, essential in the great battle of Health *versus* Disease. He is not merely expected to provide ammunition in the form of efficient medicines, but also the ordnance and arms which to the champion of health are at least of equal importance. Those many little pieces of apparatus that pass under the name of "medical requisites," and form, perhaps, the chief portion of our "druggists' sundries," are expected both by the physician and his patient to be procurable from the pharmacist. As a consequence no pharmacy is simply a dispensary. The dispensary—where as such it does exist—is only an important department. The proper functions of a follower of our responsible calling are therefore not by any means purely pharmaceutical; not even when examined from the utopian standpoint, formerly so much affected by enthusiastic thinkers with the reforming mania. This being the case, we are quite justified in maintaining that the analysis of urine should form part of the education of every student, and be conducted, even in its more advanced branches, when necessary, by every pharmacist.

Urinary analysis, to-day, is of growing and recognized importance. The first aim of every capable physician is to diagnose disease with something approaching the accuracy of a scientist. To do this with proper success, every faculty of observation must be developed to the utmost. All physicians should be trained observers of the highest class; so trained that each petty detail, as well as every striking symptom, can easily be apprehended and as readily comprehended. In the diagnosis of internal diseases—the saddest and most fatal which affect our feeble frame—the difficulties of the physician are especially formidable. Locked in a protecting embrace, loosened only by the hand of death, the heart, the liver, the stomach, remain during the whole course of life shut out from the eye and hand of man, and thus render accurate diagnosis in nearly every case a stupendous problem. That it will always be so to a considerable extent is more than probable; though I may mention with regard to the stomach in particular, that a medical friend of my own has lately shown me the plans for a little apparatus which he hopes to perfect shortly, and by means of which it would be possible to photograph the inside of the stomach during life; or, at least, he thinks so, and we may heartily wish him success in his rather astonishing enterprise. Whilst, however, the physician is unable to see the wind, he can at any rate note the direction of the tell-tale straw, and in many instances the urine serves the purpose of the straw with the greatest possible success. In certain obscure maladies, the products resulting from chemical changes going on in the diseased system are voided with the urine, and point as readily to their cause, the disease, as any precipitate, obtained in ordinary analysis, indicates the presence of a base or acid.

My intention in writing this paper is to assist those many members of our Association who are still in their student days; to help them, in fact, to acquire a practical knowledge of a useful branch of analysis, without burdening their memories with the redundancy of matter collected in great works of reference from the experience of two generations. Many of the most important improvements in urinary testing are of so recent introduction that few, if any, text-books even are quite up to date, and in addition, those manuals are largely made up of elaborate processes for the determination of normal and abnormal constituents of urine, which are very rarely of semeiological importance. My paper, therefore, will be more *selective* than, in its widest sense, *descriptive*. It will be my aim only to describe methods which I have found *practically* useful, and to write more from an educational standpoint than from that affected by the critic. I may add that whilst engaged in carefully describing the processes I prefer to adopt, I desire you to remember that there is no intention of depreciating other methods, adopted with at least equal success by other workers. They would have been in many cases at least noticed; but the space of a mere paper and forty minutes of time forbid it. We will now proceed to our subject.

Physical Characters.—When a sample of urine is received for analysis, the first proceeding is to make a note of its chief physical characters, such as colour, relative transparency or opacity, specific gravity and volume. It is necessary to determine the latter, more especially, in those cases where the whole amount voided in a given period,—such as twenty-four hours,—is sent. The specific gravity is conveniently taken at or near 60° F. by means of the variety of hydrometer known as a "urinometer." There are numerous makes of this instrument in the market, and many of them are anything but accurate. On account of the risk of fracture, urinometers of gilded brass are often preferred to those made of glass; but for several reasons I prefer the latter. One of the cheapest of these is that known as "Hicks' patent," and is supplied by Mr. J. J. Hicks, of 8, Hatton Garden, E.C. Although low in price, those that I have examined have been fairly accurate. Should it be desired to determine the density with greater precision than these instruments will permit of, an ordinary specific gravity bottle should be used. The average specific gravity of healthy urine is about 1·020; but it varies about 0·005 on either side of that figure. Although of very little value in diagnosis, the determination gives a fair idea of the proportions of such solids as urea, or, if present, glucose.

Bulky deposits in urine are easily accounted for. Should the acidity of the urine have been destroyed through the putrefactive decomposition of urea into ammonic carbonate, the ingestion of alkaline salts, etc., earthy phosphates are naturally thrown out of solution, and on collection will respond to their usual tests. After violent exercise, a debauch, a heated debate in Parliament, or other cause inducing a feverish condition, acid urine is frequently loaded with a fawn-coloured or pink—from the presence of Prout's *purpurin*, called *uroërythrin* by Heller—deposit of acid urates, which will be found to redissolve when the liquid is warmed to about 100° F., or diluted. Uric acid in the free state when precipitated as a "cayenne pepper" deposit, or otherwise, fails to dissolve on heating or diluting the urine.

Reaction.—In reporting on a sample of urine the reaction to test papers should always be mentioned. An abnormal condition in this respect is of great semeiological importance. Urine may be acid in reaction, neutral or amphoteric and alkaline. The first, which is the ordinary condition of the fresh fluid in health, varies within certain limits, and in rough reports it is customary to qualify the word "acid" by the use of such terms as "faintly," "distinctly," etc. In those numerous cases, however, where greater accuracy is demanded, the acidity can be determined volumetrically with sodic hydrate solution, using a few drops of an alcoholic solution of phenolphthalein as an indicator. The acidity is conveniently reported in terms of oxalic acid. The volumetric solution of the Pharmacopœia, which is of normal strength, is much too strong for use in urinary analysis. A solution containing the equivalent of 10 milligrams of $C_2H_2O_4.2H_2O$ in each cubic centimetre will be found the most convenient in practice.

Occasionally recent urine is amphoteric, neutral or alkaline in health; but these conditions, although normal in herbivorous mammals, are of accidental origin and of but short duration in man. The amphoteric state, often noticed in milk, and by pharmacists in the preparation of liquor ammonii acetatis, is considered to be traceable to the simultaneous presence in the urine of both mono- and di sodic phosphates, and to the fact that no neutral sodic orthophosphate is known; or, possibly, to unequal distribution through the fluid of ammonia derived from the decomposition of urea. When fresh urine, voided by a sick person, is neutral or alkaline, the fact has considerable medical interest. In many cases, however, it is only due to the medicine the patient may be taking at the time; alkalies and organic salts of alkaline metals readily inducing the phenomenon. Certain diseases, as is well known, also induce an alkaline reaction in the urine, and the indication is therefore in practice of great diagnostic value.

Sugar.—The presence of glucose in quantity is one of the most striking peculiarities of diabetic urine. Although the chemical indications of sugar are precise enough and offer no difficulty to the practised analyst, yet it is not at all rare for a tyro to completely mislead the physician on this important point. The amount of sugar present varies so much—from 5 or 6 per cent., down to I am afraid to say how small a quantity—and the presence of other constituents obscures to such an extent the ordinary copper tests for glucose, that mistakes by young operators are very common. If present in fair quantity, a condition always accompanied by high specific gravity, the abundant yellowish to brick-red precipitate yielded on boiling with the cupric solutions of Trommer or Fehling leaves no room for doubt; but the case is different when decoloration without much precipitation takes place, or other changes are observed pointing to the presence of copper-reducing bodies only in traces.

Besides denoting the presence of sugar, Fehling affords many rather useful indications to a skilled observer, and is therefore largely used in the laboratory. For detecting glucose, however, Nylander's modification of Boettger's bismuth test is to my thinking more delicate and satisfactory; whilst for quantitative purposes the ammoniocupric process devised by Dr. Pavy* leaves nothing to be desired. So easily carried out indeed is the latter estimation, that whenever traces of sugar are shown plainly in a sample of urine, I always determine the amount quantitatively for my own satisfaction, even if not for that of the physician. The qualitative test of Nylander is prepared by dissolving 2·5 gm. of bismuthous oxynitrate (perfectly free from silver) and 4 gm. of sodic potassic tartrate in 100 gm. of 8 per cent. caustic soda solution. On boiling 10 c.c. of this reagent with 1 c.c. of the suspected urine for a short time, the whole will assume a black appearance if sugar is present, even in fair traces. An easily applied though rough confirmatory test is that of Moore, which consists in boiling the urine for a minute or two with solution of potash, when any sugar present is degraded into caramel; this colours the urine and yields its characteristic odour on supersaturating with sulphuric acid. Although not exceedingly delicate, this reaction can always be observed in diabetic urine, and is on that account of some use. It should be remembered, however, that certain bodies which may be accidentally present in urine, such as chrysophanic acid, also respond to the test. In this connection it is as well to observe that some normal constituents, such as uric acid, creatinin, etc., and certain abnormal components of urine also reduce Pavy's solution; amongst the latter may be mentioned chloral hydrate, which is split up by the alkali into chloroform and potassic formate, the former body rapidly reducing the copper. Such require to be very carefully guarded against; but those deoxidizers normally present are really infinitesimal in amount, and do not interfere to any great extent with one's figures. That traces of sugar are really present in normal urine I think has been sufficiently proved, especially by the recent researches of Molisch, and which I have myself confirmed.

The quantitative process of Dr. Pavy may be thus described. Taking advantage of the fact that cuprous oxide dissolves in ammonia, forming a colourless liquid, he treats an ammoniacal cupric solution at a boiling temperature with sufficient saccharine urine to exactly discharge the blue colour. The great advantage of this method over that of Fehling lies simply in the fact that there is no bulky red precipitate to interfere with the ready observation of the end reaction. The result is as precise, in fact, as that of any other process in volumetric analysis. To prepare the test solution, dissolve 20·4 gm. of sodic potassic tartrate, and the same weight of caustic potash in distilled water; dissolve separately 4·158 gm.

* *Lancet*, March 1, 1884, p. 376.

of pure cupric sulphate in more water with heat; add the copper solution to that first prepared, and when cold, add 300 c.c. of strong ammonia, and distilled water to 1 litre. The estimation is conducted as follows: 10 c.c. of the ammoniated cupric solution (=0·005 gm. of glucose) are diluted with 20 c.c. of distilled water, and placed in a small flask. This is attached by means of a cork to the nozzle of a Mohr's burette, fitted with a glass stop-cock, and previously filled with diluted urine. The cork of the flask should be traversed by a small bent tube to permit steam to escape. Now heat the flask with a spirit lamp or small Bunsen flame, until the blue liquid boils actively. Turn the stop-cock in order to allow the urine to flow into the hot solution—which should be kept at the boiling point—at the rate of about 100 drops per minute (not more or much less) until the azure tint is exactly discharged. Then stop the flow, and note the number of cubic centimetres used. That amount of dilute urine will contain 5 milligrams of glucose. To render the determination as accurate as possible, the urine should be diluted to such an extent that not less than 4, or more than 7 c.c. are required to decolorize the solution, and the proportions necessary will be found to vary from 1 part of urine in 2½, to 1 in 30 or 40. The subsequent calculation is very simple. If you wish to give the percentage of sugar, multiply 0·005 by 100, and divide the product by the number of cubic centimetres of dilute urine employed. The figure thus obtained, multiplied by the extent of dilution—*i.e.*, if 1 of urine in 20, by 20—gives the required percentage. The number of grains per fluid ounce can of course be obtained by multiplying the percentage by 4·375. To observe easily the exact end-reaction, a piece of paper or other white body should be placed behind the flask. One public analyst has the half of an ordinary opal gas-globe fixed in the proper position. If the operator objects to the escape of the waste ammoniacal fumes, they may be conducted by a suitable arrangement into water or dilute acid.

Albumin. Qualitative.—The discovery of the presence or absence of this body in urine is one of the most important duties of the medical analyst. The faintest trace of albumin may afford most valuable information to a physician, and this body and sugar may be classed as unexceptionally the chief pathological constituents known to occur in morbid urine. Fortunately even mere traces are discoverable with the greatest possible ease, if only the analyst works with the most ordinary care and intelligence. For the qualitative examination of urine for albumin, there are numerous methods advocated by various chemists, many of which yield exceedingly delicate results. The three that I will briefly describe are amongst the most popular in use, and are amply sufficient for all practical purposes. *The boiling test:* First pass a portion of the urine through frozen filtering-paper, and to about 10 c.c. of the clear limpid fluid (which should be faintly acid in reaction) contained in a rather narrow test-tube add a single drop of acetic acid. Hold the tube in a small solid flame, preferably that of a spirit lamp, in such a manner that the upper inch or so only of the liquid is raised to the boiling point. Any albumin present is then coagulated, and stands out in bold relief against the pellucid lower layer, its appearance varying from a faint haze, if only a trace is present, up to a dense coagulum when albumin occurs in quantity. This test is exceedingly delicate. The acid is simply added to prevent precipitation of insoluble salts, and only a trace is used in order to prevent the production of the mucin haze. Mucin, when present, is apt to interfere somewhat with this and the following test; but, fortunately, its identity can easily be determined. *The nitric-acid test:* Prepare a saturated solution of magnesic sulphate by dissolving 10 parts of the salt in 13 of water with the aid of heat, cool and filter. To 5 volumes of this solution add 1 volume of 70 per cent. nitric acid. This is Dr. Roberts' nitric-acid reagent, and the magnesic sulphate is only employed for the purpose of increasing the specific gravity of the solution.* Place some of the reagent in a tube, and carefully, by means of a pipette, add an equal bulk or more of the well-filtered urine. The junction of the two liquids should be sharply defined. If there is much albumin, a more or less opalescent zone immediately forms at the point of junction; but when traces only are present a period of time, varying from a couple of minutes to about a quarter of an hour, is required for the development of the zone. It is important to notice that the zone appears at the *base* of the urine, just above the line of demarcation, as mucin is also precipitated by nitric acid. It always appears, however, as a more or less diffused haze towards the *upper* part of the liquid, and quite distinct from the albumin ring. I have known a zone of urates to form when applying this test, but they readily dissolve on warming. A very simple and excellent way of applying the above Heller's or contact-method of testing is to use an ordinary half-ounce syringe instead of a test-tube. First draw up an inch or so of clear urine, and then a sufficiency of the reagent. The danger of mixing the liquids by clumsy manipulation is thus reduced to a minimum. *The picric-acid test:* The use of trinitrophenol as a test for albumin in urine was first proposed by Galipe, and has been more recently advocated by Dr. George Johnson.† Although rather hastily condemned by certain authorities at first, my own constant use of it, in conjunction with the boiling and nitric-acid tests, ever since its introduction, and in numerous very varying cases, leads me to give this method my unhesitating approval. In addition to its excessive delicacy, the great advantage possessed by picric acid is that it produces no precipitate whatsoever with mucin. On the other hand, what at first sight appears to be its disadvantage is that it yields a precipitate with certain other bodies that may be accidentally present in the urine, such as alkaloids and peptones. On heating the solution, however, to the boiling point, a precipitate caused by these latter bodies dissolves, whilst a true albumin precipitate is unaffected. Instead, therefore, of misleading the analyst, picric acid adds to his information as to the presence or absence of certain abnormal bodies. The reagent is prepared by dissolving 140 grains of recrystallized trinitrophenol in Oj. of distilled water by aid of heat, allowing to stand for a day or two and decanting the bright solution for use. To apply the test, mix the solution with an equal volume of the clear urine, notice the effect, and then heat to ebullition. If preferred, Heller's contact method, recommended in the description of the nitric acid test, may be adopted; but I am not in the habit of employing it. Another very delicate test is to acidulate strongly with acetic acid, and then add a few drops of recently prepared potassic-ferrocyanide solution. An opalescence appearing in some little time indicates traces of albumin. Dr. Pavy's pellets, which contain a mixture of ferrocyanide with citric acid, must be condemned, as they will often react in non-albuminous urine.

Albumin. Quantitative.—As Mr. Proctor has lately remarked in regard to the examination of certain, not specially potent, pharmaceutical preparations, the fine accuracy of the first-class scientist is hardly essential in urinary analysis. When a physician asks you to determine daily the amount of coagulable albumin present in a certain urine, he has no desire to be told to a remote decimal the absolute amount that the sample may contain. His chief wish is to discover whether under the treatment he is adopting, the abnormal body diminishes or increases in quantity. Of the numerous methods of procedure adopted or proposed for this purpose, I prefer a process that has lately become very popular on the continent. It will be found available for the estimation of albumin with ease, and at the same

* *Medical Chronicle*, No. 1, October, 1884.

† *British Medical Journal*, October 11, 1884.

time a sufficient amount of accuracy to satisfy therapeutical demands. Invented by Dr. Esbach, the test simply consists in noting the height in a graduated tube that is reached by a picric acid precipitate of albumin, thrown down from a measured quantity of urine, after resting for twenty-four hours. The determination is entirely empirical; but the graduations on the tube were very carefully worked out by Dr. Esbach and others, and the results have been pronounced quite accurate enough for all clinical requirements. The original *albuminimètre* of the inventor is a stout glass instrument of test-tube shape, about six inches in length, and properly graduated. It is made by Messrs. Brewer Frères, of 43, Rue St. André des Arts, Paris, and sold at more than double the price that Mr. Cetti, of 36, Brooke Street, Holborn, supplies an imitation. The *réactif du Dr. Esbach* is prepared by dissolving 10 gms. of picric and 20 gms. of citric acids in 900 c.c. of water by aid of heat, and making up the volume of the solution to 1 litre when cold. Dr. George Johnson states* that the presence or absence of citric acid exercises no appreciable effect under any conditions of the urine, and this statement my own experience of the test enables me to confirm. It is necessary, of course, that the urine should remain distinctly acid.

Urea.—Carbamide or *urea*, as it is well named, is the chief solid and one of the most characteristic constituents of urine. It is the comparatively simple ultimate form in which the albuminoid-nitrogen of the body is excreted. Uric acid, creatin, creatinin, allantonin, etc., may be considered to be higher stages in the process of degradation, as they can all be split up into urea and other bodies. The combinations of carbamide with nitric and oxalic acids are very insoluble, and yield crystals displaying characteristic forms under the microscope. Owing to the fact that urea bears such an intimate relation to the wasting of the nitrogenous tissues, it is very often a matter of great interest to estimate the amount excreted.

The most satisfactory method of determining urea is to take advantage of the ease with which its nitrogen can be extracted and measured in the free state. Treated with a strongly alkaline solution of sodic hypobromite or hypochlorite, urea under certain conditions is completely broken up, its carbon being oxidized to carbonic anhydride, which is absorbed by the free alkali, the hydrogen converted into water; and its nitrogen liberated as gas. I say "under certain conditions" advisedly, for as usually conducted the whole of the nitrogen is not evolved. The use of hypochlorite of sodium was formerly advocated; but it does not act so energetically as its bromine analogue. Sodic hypobromite was first suggested for the purpose by Knop in 1860, and since that period its employment has become general. Recently Dr. Squibb,† from a praiseworthy desire to render the estimation as simple as possible to the physician, has reverted to hypochlorite. Mr. Martindale, I remember, brought Dr. Squibb's homely little contrivance for the determination under the notice of the profession at the last meeting of the British Medical Association.

The collection and measurement of the evolved nitrogen can be done in any suitable apparatus, from the modified pneumatic trough of Russell and West to Mr. Allen's nitrometer or an inverted burette. The *ureometers*, proper, which have been devised are almost legion in number, and reflect considerable credit on the mechanical ingenuity of analysts. They are all used with either water or mercury; the employment of the latter, although yielding a more strictly accurate result, being, however, quite unnecessary in medical analysis. Amongst the best are those of Noël, Dupré and Gerrard. Formerly I was in the habit of using the rather primitive contrivance of Russell and West; but although its results are not very inaccurate the operation of using it is decidedly messy. Since Mr. Gerrard brought his little apparatus before the Pharmaceutical Society* I have always made use of it, and can recommend the instrument as simple in construction, not liable to get out of order, easy to manipulate and scientific in principle. It is, perhaps, as well I should add that I am engaged in a careful study of this branch of my subject. My work is not yet much advanced, but I think it will result in the publication of certain objections to a detail of this and similar instruments. I shall now proceed to make a determination of urea before you by Gerrard's apparatus. Should you require details of the process in the future, I would refer you to his note in the *Pharmaceutical Journal*.†

I may mention that if through age or other causes the urea has been converted wholly or partially into ammonic carbonate, the analyst will yet obtain a fairly accurate result. The nitrogen still exists in the liquid, and ammoniacal salts are decomposed by the hypobromite in a similar manner to urea. With regard to other azotized bodies which may be present, the following facts may be noted: uric acid gives up about half its nitrogen and creatin two-thirds. Quinine, morphine, strychnine, coniine, nicotine, aniline, ethylamine, acetamide, salicylamide, benzamide, asparagin, leucin, taurin, glycocoll, hippuric and amidobenzoic acids, etc., fail to yield their nitrogen; caffeine loses less than a fourth; and albumin is acted on only very slowly by the reagent.‡

Uric Acid.—Certain gout specialists are attaching increasing importance to the accurate quantitative determination of uric acid in urine; and it may possibly become more the practice than even at present to request pharmacists to carry out these estimations. The old and rather inaccurate plan was to acidify the urine, concentrate somewhat, and weigh the resulting deposit of uric acid. By this means the figure obtained was always too low, and the process therefore could not be commended. Dr. Pavy§ has suggested a method of estimation based on the fact that uric acid exercises a reducing action on an alkaline cupric solution; but I do not consider his method much better than that last described. I have found that the presence of other substances is apt to cause great variability in the reducing effect of uric acid on copper, cuprous urate instead of oxide occasionally forming. The latest, and by far the best, method proposed has been devised by Professor Haycraft,‖ and my own experience of its use enables me to give the process my unqualified approval. His method is based on the known fact that argentic urate, unlike most other salts of silver, is insoluble in ammonia, but dissolves in nitric acid. The solutions necessary are these: 1. Dissolve about 8 gms. of ammonic thiocyanate crystals in a litre of water, and adjust to $\frac{N}{10}$ argentic-nitrate solution; dilute it for use with nine volumes of water and label "$\frac{N}{100}$ ammonic-thiocyanate solution." 2. Dissolve 5 gms. of argentic nitrate in 100 c.c. of distilled water, and add ammonia until the solution becomes clear. 3. Dilute 70 per cent. nitric acid with two volumes of distilled water, boil, to destroy the lower oxides of nitrogen, and preserve from the action of light. 4. A saturated solution of ferric alum. 5. Strong solution of ammonia. The following is a description of the process:—Place 25 c.c. of urine in a beaker with 1 gm. of sodic bicarbonate. Add 2 or 3 c.c. of strong ammonia, and then 1 or 2 c.c. (or an excess) of the ammoniated argentic solution. The precipitate which then falls is so fine and gelatinous that a special procedure is necessary in order to collect it. The subsequent use of nitric acid, too, renders the employment of paper quite inadmissible. In a 4 oz. glass funnel an asbestos filter is prepared in the usual manner. That is to say, by filling to about one-third with broken glass,

* *Lancet*, July 10, 1886.
† *Ephemeris*, January, 1884, p. 448.

* *Pharm. Journ.*, [3], xv., 455.
† *Pharm. Journ.*, [3], xv., 464.
‡ Méhu: *Urine, Normale et Pathologique*. 1880, p. 150.
§ *Medico-Chirurgical Transactions*, lxiii., p. 322.
‖ *British Medical Journal*, Dec. 12, 1885, p. 1100.

and then covering this with a bed of good asbestos to about a quarter of an inch deep. This is best done by shaking the latter in a flask with water until the fibres are thoroughly separated, and then pouring the emulsion so prepared in separate portions on to the broken glass. On account of the nature of the precipitate and of the filter, it is necessary to use a Sprengel's mercury or water pump in order to suck the liquid through. The small apparatus sold to students by chemical instrument makers will be found to answer admirably. Having collected the precipitate of argentic urate on the prepared filter, wash it repeatedly with distilled water, until the filtrate ceases to become opalescent with a soluble chloride. Now dissolve the pure urate by washing it through the filter with a few cubic centimetres of the special nitric acid. Place in a beaker, and estimate the silver by Volhard's method, which can be employed in the presence of nitric acid. It is carried out thus: add to the liquid in the beaker a few drops of the ferric-alum solution to act as an indicator (Haycraft throughout his paper incorrectly says potash-alum), and from a burette carefully drop in $\frac{N}{100}$ ammonic-thiocyanate solution until a permanent red colouration of ferric thiocyanate barely appears. The number of cubic centimetres used of the thiocyanate solution, multiplied by 0·00168, gives the amount of uric acid in the 25 c.c. One milligram may be added to this figure to compensate for loss, and the whole multiplied by four gives the percentage of uric acid in the urine. The sodic bicarbonate is added in the early part of the process to prevent decomposition of the argentic urate, which would occur if that salt were not present.

Shortly after the publication of Dr. Haycraft's paper, a certain eminent physician, who has almost made this subject his own, asked my opinion on a seeming paradox that he had observed with the urine of one of his patients. On the addition of the silver solution to this urine, the precipitate was found to be abnormally heavy, pointing apparently to the presence of uric acid in abundance. At the conclusion of the analysis, however, he was astonished to find that the result, instead of being high, was rather lower than usual. This puzzled him greatly, and, I must confess, seemed at first sight almost inexplicable to me. I got him to send me some of the urine, however, and found it true enough that the precipitation was at least three or four times as voluminous as I had ever before noticed. I found, moreover, that the addition of more reagent produced a further precipitate. This immediately aroused the suspicion that some abnormal chemical was present—a body whose silver salt was insoluble both in ammonia and nitric acid. An iodide immediately suggested itself, and on adding a trace of chlorine and shaking with chloroform, the deep violet colour assumed by the latter at once pointed to the culprit. An interview with our medical friend soon extracted the information that he was treating his patient with sodic iodide. The lesson to be derived from the incident is this:—When the appearance of the precipitate points to the presence of an iodide, always add silver solution until a precipitate ceases to form—in other words, a fair excess of the reagent. The final reading, then, will not be interfered with.

Bile Salts.—The detection of the biliary acids is best done by means of the peptone test of Dr. Oliver,* a physician who, in conjunction with a leading firm of Yorkshire pharmacists, has built up a system of clinical urinary analysis very popular with medical men. The urine, which should be very clear, is diluted to a specific gravity of 1·008. One cubic centimetre of this is added to 3 c.c. of Oliver's reagent. An opalescence at once appears, which will be found to be more or less distinct according to the quantity of bile-salts present. Keller's contact-method can be advantageously employed for applying the test. Dr. Oliver's reagent is prepared by dissolving 30 grains of flesh peptone, 4 grains of salicylic acid and 30 minims of 33 per cent. acetic acid, in enough water to yield 8 fluid ounces of product. The solution should be rendered perfectly brilliant by passing it through frozen filtering-paper. It is quite permanent.

* Oliver: 'On Bedside Urine-Testing.' 1885, p. 210, *et seq.*

Chlorides.—When considered necessary to determine the amount of sodic and other chlorides in urine, the direct estimation of Volhard is to be preferred. The principle of the process was described under uric acid.

Phosphates.—The amount of phosphoric acid is best estimated by the uranic-acetate method, described in Sutton's 'Volumetric Analysis.' A rough idea of the proportion of earthy phosphates can be obtained by supersaturating some of the clear acid urine with ammonia, warming, and separating, drying and weighing the precipitate. Although used by some medical men, the process is, of course, very inaccurate.

Microscopical Examination.—The microscopical examination of deposits in morbid urine is almost always valuable in its results. When the terrible affection known as Bright's disease is shown by quantities of albumin drained from the blood, the delicate granular or hyaline "casts" of the *tubuli uriniferi* can often be observed, especially on staining with a few drops of iodine solution. In those ropy albuminous urines which are only filtered with great difficulty, and do not clear on warming, the microscope reveals the round corpuscles of pus, accompanied usually by much amorphous mucin. Blood when present in a high-coloured urine is shown by the characteristic strings of discs, recalling irregular rolls of money. If large quantities of blood are present the urine becomes alkaline and highly albuminous, the alkali dissolving the hæmoglobin. It is then necessary to employ other tests, amongst the best of which is the spectroscopic, provided the urine is fairly recent, or the well-known hæmin reaction can be applied. Crystalline precipitates as a rule are easily recognized, but for purposes of comparison the worker should keep by him well-mounted specimens of typical deposits. His list of slides should include a good selection of the various forms of uric acid, triple phosphate and calcic oxalate; hippuric acid and calcic hippurate; the various urates and oxalurates, calcic carbonate, cystin, casts of the uriniferous tubules, spermatozoa, etc. The application of microchemical reagents is always useful, at least for confirmatory purposes. For instance, a neutral or faintly alkaline urine will often yield small crystals of triple phosphate not at all unlike octahedral calcic oxalate. Their instant solubility in a droplet of acetic acid allowed to flow on to the slide, however, immediately reveals their identity. For these observations the particulars given in Professor Attfield's 'Chemistry' will be found sufficient. I have thought it advisable not to burden this paper—already too long—with verbal descriptions of the characteristic shapes of the various crystals. A glance at a carefully-done plate, or, better still, a microscopic slide of the object, will produce a more vivid impression than pages of elaborate letterpress.

I trust these few notes on an exceedingly wide subject will assist our younger members to carry out with credit the easy, but important, analyses demanded every day by all careful physicians.

The paper was illustrated throughout by experiments and specimens and gave rise to a brief discussion, during which Mr. Ellwood expressed a doubt as to the reliable character of the picric acid test for albumin, as he stated he had never been able to obtain good results by this method. Incidentally he mentioned that his interest had lately been excited in the subject through the urine of M. Chauffat, the sleeping Frenchmen, having been submitted to him for analysis. He also called Mr. Saul's attention to the omission of a test for hippuric acid from his paper, as it was this body he had been requested to determine.

Mr. Bird asked whether it was absolutely necessary to prepare the hypobromite salt at the time of testing, and whether the decomposition of the solution was spontaneous or due to exposure to air, as the latter might be overcome by covering the solution with a layer of paraffin or similar body. He also asked what method Mr. Saul considered the best for removing the albumin from urine prior to a further analysis.

Mr. Phillips wished for information regarding the picric acid test for sugar in urine.

Mr. Dymond asked for an explanation of the hæmin reaction, which had only been referred to incidentally in the paper, and pointed out that as long as the nitric acid employed in testing was white, there was no necessity for boiling it in order to convert any lower oxides present.

In reply Mr. Saul remarked that, owing to the extent of the subject, he had omitted from his paper many methods of minor importance, and had also abstained from discussing the comparative merits or demerits of the various tests to any extent. However, in reply to Mr. Ellwood, he could confidently recommend picric acid as one of the most delicate and reliable tests for albumin. As to the preservation of the hypobromite solution, he thought the method suggested by Mr. Bird would probably answer, though he much preferred to prepare it extemporaneously. He always heated the urine with a little acid in order to separate the albumin from it. Mr. Saul expressed an opinion that sugar was present in a small proportion in all urine, and he did not employ Johnson's picric acid test for its detection or estimation. With regard to the hæmin test, which was referred to in the paper, Mr. Saul said it was a micro-chemical test used for the detection of blood. It consisted in evaporating the solution with glacial acetic acid and a soluble chloride, when, if blood was present, the peculiar oblique oblong crystals of hæmin were obtained and easily recognized by means of the microscope.

Throughout the discussion there was a strong tendency of the speakers to advocate the advisability of chemists undertaking analyses of urine, since medical men are gradually relying more and more on the results of these analyses in order to ascertain the daily condition of their patients.

Parliamentary and Law Proceedings.

Prosecution under the 17th Section of the Pharmacy Act.

At the Birmingham Police Court on Thursday, April 7, before Messrs. Cook, Baker and Harris, Henry Johnson, drysalter, etc., of 146, Gooch Street, was charged with having unlawfully sold on the 29th ultimo, to Alfred Wright, Assistant Secretary to the Chemists' and Druggists' Trade Association of Great Britain, a certain poison, to wit, one ounce of oxalic acid, the same not being distinctly labelled with the name of the seller of the same in contravention of the 17th section of the Pharmacy Act, 1868. Mr. Porter (Messrs. Glaisyer and Porter), Solicitor to the Association, appeared for the prosecution, and the defendant appeared in person.

In reply to the Magistrates' Clerk the defendant said it was quite true that he had infringed the Act.

Mr. Porter: I wish to say one word in regard to the circumstances of the case. This is the second offence of the kind charged against the defendant. On January 21, 1886, he was charged before the magistrates for a similar offence, and on that occasion he made a promise that he would not sell poisons again. Under these circumstances a nominal fine only was inflicted. Now, as this is a second offence he is liable to a penalty of £10.

The Magistrates' Clerk: It is not charged as a second offence.

Mr. Porter: I submit that makes no difference.

The Magistrates' Clerk: Oh yes, it does.

Mr. Porter: Then I will read the section (section 17 read). I venture to submit the fact of a previous offence does not require to be stated in the summons.

The Magistrates' Clerk: It does not matter what you submit. I shall advise the Bench it does.

Mr. Porter: My witness will prove this is the second offence, and that is all that is necessary.

The Magistrates' Clerk: You must charge it as the second offence, otherwise you cannot go upon it.

Mr. Porter: I will call my witness.

Mr. Alfred Wright was then called, sworn and examined. He stated that on the 29th ultimo he went to the defendant's shop in Gooch Street, and purchased an ounce of oxalic acid which was wrapped in a packet. Mr. Johnson's name did not appear on the packet.

The Magistrates' Clerk: Was Mr. Johnson there?

Witness: I did not see him.

Was there on the packet the name of the former occupier of the shop?—Yes, sir (packet here produced and handed to the Bench).

Did the defendant purchase the business from him?—I believe he did.

Mr. Porter: Has the defendant been before the Court previously on a similar charge, to your knowledge?

Witness: Yes, sir.

Mr. Baker: Johnson was using up the old labels.

Witness further stated that defendant on this occasion used precisely the same kind of labels that he was fined for using before.

Mr. Porter said defendant was not a registered chemist and druggist, and was an illegal trader under the Act.

Defendant denied this statement, and said the poison he was charged with selling was of the simplest possible description. He added that it was not he who sold it, but his assistant.

The Magistrates' Clerk: Why do you have it in your shop?

The Defendant: We can sell it wholesale but not retail.

Mr. Porter: That is not so.

The Magistrates' Clerk: Then why do you sell it retail?

The Defendant: Well, I gave my servant instructions not to sell it retail, but he disobeyed my instructions.

Mr. Cook: Of course the law against selling poisons illegally should be rigidly enforced, else it would not be any good at all. You must pay a fine of 20*s.* and costs.

On the application of Mr. Porter the magistrates allowed the solicitor's fee for attendance.

The Sale of Oxalic Acid.

On Tuesday last, Mary Ann Haynes was charged on remand at the Weymouth Police Court, on the charge of having administered oxalic acid to her husband. The presence of the poison in a packet of cocoa and in some tea was proved by Mr. T. B. Groves. Evidence was given of the sale of the poison by a grocer in Weymouth, and eventually the prisoner, who pleaded not guilty, was committed for trial at the Winchester Assizes.

ANSWERS TO CORRESPONDENTS.

J. Richards.—Try glycerine of tragacanth.

Nemo.—We possess no information as to the composition of the preparation mentioned.

Ipecac.—"Tropæoline" is a generic term, applied to a class of oxyazo- and amidoazo-sulphonic acids, some of which are used as dye-stuffs, and one of them "tropæoline O O" is used as an indicator in alkalimetry. Phthalic acid is the orthodicarboxylic acid of benzene, and is described in most works on organic chemistry.

Preliminary.—We presume that it is expected that correct answers will be given to all the sums. At any rate we do not feel justified in holding out the hope that marks are given for "sums done in the right manner and wrong in the working."

Communications, Letters, etc., have been received from Messrs. Gibbs, Marsden, Mee, Steenbuch, Draper, Stables, Old Pharmacist, Ipecac, Preliminary.

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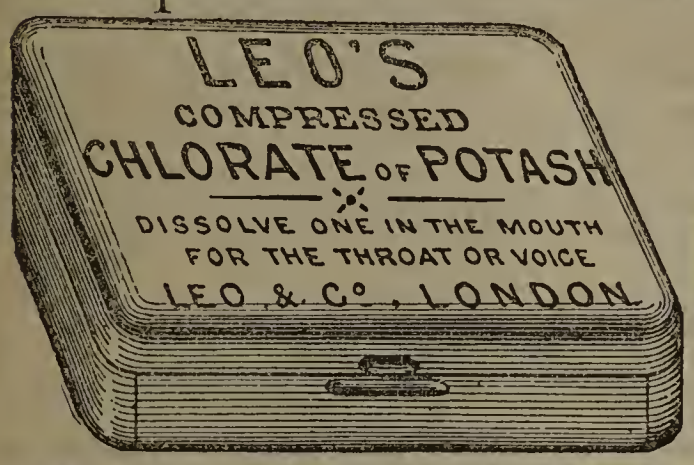

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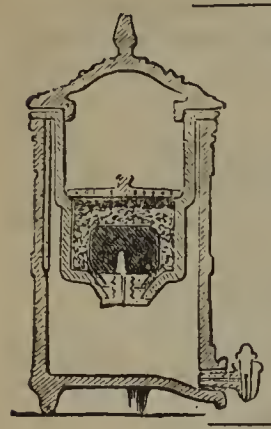

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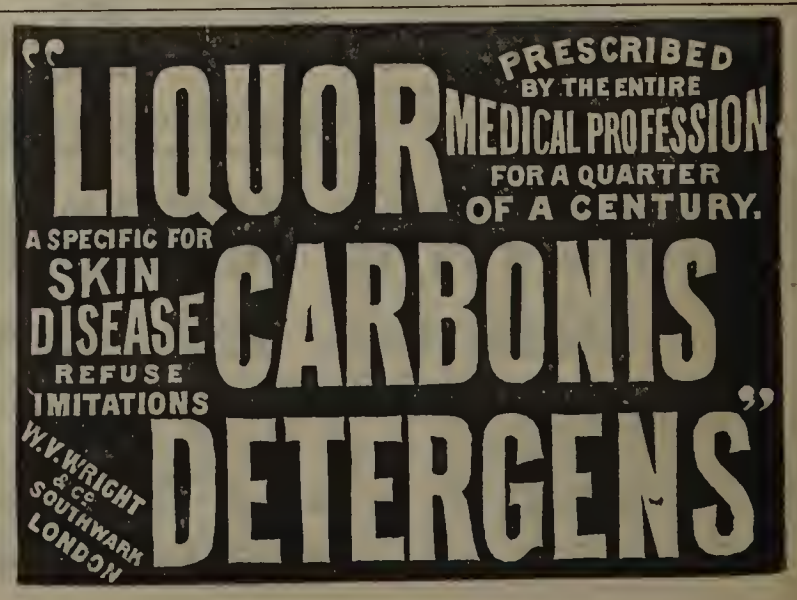

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Valuers, Transfer Agents & Auctioneers,
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Established 1870.

HOME COUNTY.—Good class Dispensing BUSINESS. Returning £1300. Full prices. Price only £1000.

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The only **Reliable** and **Perfect** Solution of Podophyllin.
Dose—10 to 60 minims.
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Prepared and originated by
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WANTED.—First-class Dispensing Businesses, either in London or good Provincial Towns. Profits not under £500 yearly.

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Terms for valuation on application.

Appointments by post or wire have immediate attention.

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INGRAM & ROYLE *having been appointed SOLE CONSIGNEES for the United Kingdom and Colonies, beg to inform the Trade that the price on and after this date will be as follows:—*

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CARRIAGE PAID to any Railway Station in England and Wales or Port in Ireland and Scotland.

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24th MARCH, 1887.

SPECIAL NOTICE.

INGRAM & ROYLE

Have the pleasure to announce to the Trade that they have been appointed

SOLE AGENTS

FOR THE

CARLSBAD SALTS

AND

WATERS.

Full details will be forwarded shortly per circular.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street

The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 878.] SATURDAY, APRIL 23, 1887. [PRICE FOURPENCE

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

NOTICES.

SPECIAL NOTICE.

Next Saturday, April 30th, is the last day on which the Secretary can receive Subscriptions.

EXTRACT FROM THE BYE-LAWS.

SECTION 1, CLAUSE 10.—"All Subscriptions for the Current Year shall become due upon election, and *all Annual Subscriptions shall become due on the first day of January in every year;* and if any Member, Associate, or Apprentice or Student shall not have paid his annual subscription before the first day of May in any year, his name shall be omitted from the Register of Members, Associates, and Apprentices or Students of the Society, certified by the Council at the Annual Meeting."

SECTION 17, CLAUSE 3.—"Any Member or Associate, Apprentice or Student, desiring to retire from the Society, shall send notice thereof to the Secretary in writing, together with the Certificate or Diploma of Membership, if any, held by him. *No Member or Associate shall be released from his obligation to pay his annual subscription until such time as the Certificate or Diploma of Membership, if any, shall have been returned.*"

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Cheques and Post Office Orders should be made payable to the Secretary, and crossed "London and Westminster Bank."

ANNUAL GENERAL MEETING.

Notice is hereby given that the forty-sixth Annual General Meeting of the Members and Associates in Business of the Society will be held at 17, Bloomsbury Square, Middlesex, on Wednesday, the 18th day of May, 1887, at eleven o'clock in the forenoon, for twelve *precisely*, to receive the report of the Council, and to elect the Council and Auditors for the ensuing year.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

In the practical portion of the Major Examination standard works of reference are provided for the use of Candidates at the discretion of the Examiner. No other books or memoranda are allowed.

SPECIAL NOTE.

Each Candidate must state, at the time of giving notice, whether he desires to be examined in London or in Edinburgh.

THE SCHOOL OF PHARMACY

OF THE

Pharmaceutical Society of Great Britain.

FORTY-FIFTH SESSION, 1886—87.

Emeritus Professor REDWOOD.....CHEMISTRY AND PHARMACY.

Professor BENTLEY .....BOTANY AND MATERIA MEDICA.
Professor WYNDHAM DUNSTAN .....CHEMISTRY.
Professor ATTFIELD .....PRACTICAL CHEMISTRY.
Mr. JOSEPH INCE .....PHARMACY AND PRACTICAL PHARMACY.

SYSTEMATIC AND PRACTICAL BOTANY.

The Summer Course on Systematic and Practical Botany will commence on Saturday morning, May 7th, at half-past eight o'clock, in the Gardens of the Royal Botanic Society, Regent's Park, and will be continued on the succeeding Friday and Saturday mornings, at the same hour, until towards the end of July.

THE LECTURES ON
BOTANY AND MATERIA MEDICA

are on Thursday, Friday and Saturday mornings, at 9 o'clock, and comprise the following subjects:—

1. Structural and Physiological Botany, which is especially adapted to meet the requirements of pharmaceutical students.
2. Organic Materia Medica, comprising the medicinal substances obtained from the organic kingdom, which are considered in the order of the natural historical relations of the organized beings which produce them.
3. Systematic and Practical Botany, which is taught during the summer months in the Royal Botanic Society's Gardens, Regent's Park.

All the Lectures are fully illustrated by every means to which recourse can be had, including fresh, dried, and preserved portions of plants, together with their products and secretions; and by an extensive series of drawings, diagrams, and preparations, as well as by experiments and microscopical preparations.

In order to test the proficiency of the pupils, and to bring them into more intimate intercourse with the Professors, a *viva voce* examination is held after each Lecture. It is expected that all pupils will attend these examinations.

THE LECTURES ON
CHEMISTRY

are on Monday, Tuesday and Wednesday mornings, at 9 o'clock, and comprise the following subjects:—

1. An exposition of the physical forces involved in chemical and pharmaceutical operations and changes.
2. The chemistry of inorganic bodies, including a description of the elements and their more important inorganic compounds, especially those used in medicine.
3. The chemistry of organic compounds, with a description of such as have important applications in the arts and in medicine.

The subjects are fully illustrated with experiments, diagrams and specimens, and examinations of the class are held on those subjects which have been previously treated of in the lectures.

PHARMACY AND PRACTICAL PHARMACY.

Lectures every Thursday at 5 p.m. Demonstrations every Tuesday and Friday at 5 p.m. First Course from October to February. Second Course from March to July.

One Course (five months) . . .	£2 2 0
Session (ten months)	3 3 0

INSTRUCTION IN
PRACTICAL CHEMISTRY

Daily, at 10 o'clock, in the Laboratory, by the Professor and Demonstrators. The Laboratories are open from ten o'clock in the morning until five in the afternoon daily, except on Saturdays, when they are closed at two o'clock. They are fitted up with every convenience for the study of the principles of Chemistry by personal experiment. They are specially designed for the student of Pharmacy, but are equally well adapted for the acquirement of a knowledge of Chemistry in its application to Medicine, Manufactures, Analysis, or Original Research. There is no general class for simultaneous instruction, each Student following an independent course of study always determined by his previous knowledge; pupils can therefore *enter for any period at any date*. A Junior course occupies about five months. A complete course of instructions including the higher branches of Quantitative Analysis, occupies ten full months, and is dated from the day of entry to that day twelvemonth.

With a view of testing and maintaining the progress of Students the Professor holds examinations frequently. He invites all pupils to attend these classes.

Application for admission to the School, for Prospectuses, or for further information, may be made to the Professors or to their Assistants in the Lecture Theatre, or Laboratories, 17, Bloomsbury Square, London W.C.

THE PHARMACEUTICAL JOURNAL

Guaranteed Circulation of 7000 Copies Weekly.

(The LARGEST Issue of any Journal addressing Chemists and Druggists.)

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Advertisers are requested to observe:—

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2.—That letters addressed to initials or to fictitious names at a Post Office are not delivered by the Post Office Authorities, but are at once sent back by them to the writers.

3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM. JOURN.**" and must be sent only to J. & A. CHURCHILL, 11, New Burlington Street, London, W.
Telegraphic Address, "Churchill, Publishers, London."

N.B.—The Journal is supplied from the publishing office post free to any part of the United Kingdom on prepayment of 20*s.* for twelve months; 10*s.* for six months; single copy 4½*d.* To the Colonies and Abroad (excepting India and China), 22*s.*; India and China, *vid* Brindisi, 24*s.* per annum.

Payment may be made either by **Cash** in a Registered Letter, by **Postal Order**, by **Cheque** crossed London and County Bank, or by **Money Order**, payable at Regent Street, W., to J. & A. CHURCHILL. *Postage Stamps for any amount above Ninepence cannot be received in payment.*

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The amount got varies greatly, there being sometimes a considerable quantity and sometimes practically none. This seems to depend partly on the kind of leaves used, but probably also on the processes to which they are subjected. Several samples of this body, obtained at different times, have been very kindly given to me by Messrs. Howards and Sons for the purposes of investigation. These were all practically similar, but differed slightly in outward appearance. The colour varied from dark yellow to dark brown, and the consistence from that of treacle to a sticky tenacious solid. The smell was peculiar, recalling that of nicotine, but more aromatic and less pungent, while the taste was bitter and aromatic.

Under the microscope no crystals were ever observed in fresh specimens.

It is alkaline in reaction and soluble in alcohol, ether, acetic ether, chloroform, benzol, amylic alcohol and petroleum ether. Its solubility in water varies with its consistence. The solid specimens are nearly quite insoluble, while on adding water to the more fluid specimens a dense whitish precipitate is at first formed which becomes dissolved up on agitation. It therefore, in this case, dissolves the water rather than *vice versâ*.

On gently heating it becomes quite fluid. It is very soluble in dilute acids, with which it forms non-crystalline salts, all of which dissolve readily in water. If it be dissolved in rectified spirit, and treated with animal charcoal, or with acetate of lead in the usual way, to get rid of the colouring matter, the body ultimately obtained is pale yellow in colour, sticky in consistence, and non-crystalline, nor do crystals form in it even after standing for months. By repeated solution in alcohol, and repeated precipitation with ammonia, a nearly white, non-crystalline, flocculent body is obtained. The original odour and taste remain, no matter how often the purifying process is repeated. It can be dried *in vacuo* over sulphuric acid, but on exposure to the air rapidly absorbs moisture again. The purified hydrochlorate of amorphous cocaine, which is the only salt I have worked with, is also pale yellow in colour, and retains the characteristic disagreeable smell and taste. It is hygroscopic, but if tolerably pure and thoroughly dried shows sometimes a tendency to form imperfect crystals. It is very soluble in water, alcohol, chloroform, acetic ether, and amylic alcohol; insoluble in ether, petroleum ether and benzol. From a study of the physiological action and chemical relations of this body, I have been led to the conclusion that it is a *solution* of ordinary crystalline *cocaine* in *hygrin*, the liquid alkaloid which is also present in the coca leaves. Hygrin is described by Wöhler (Liebig's *Annalen*, cxxi., 372) and by Lossen (*Ibid.*, cxxxiii., 351) as a pale yellow volatile, oily body, giving the ordinary reactions of alkaloids, hygroscopic, and forming hygroscopic salts which crystallize with great difficulty. The odour, they say, recalls that of trimethylamine, but it seems to me to more closely resemble that of nicotine. This body is extracted from the leaves in greater or less amount, along with the cocaine, by the processes which are now used by manufacturers, and its presence accounts for the disagreeable properties and effects which have been observed in many samples of the hydrochlorate.

Cocaine is extremely soluble in hygrin, and when once solution has occurred, it is practically impossible to separate the two bodies, as they are both soluble in the same menstrua, and are both precipitated by the same reagents. The same holds good for their salts but not to the same extent. These facts account fully for the presence of hygrin in the hydrochlorate of cocaine as ordinarily sold, and it is the admixture of hydrochlorate of hygrin which makes the salt hygroscopic, and imparts to it the peculiar odour.

The great solubility of cocaine in hygrin also accounts for the peculiar behaviour of fluid amorphous cocaine when water is added to it, as previously mentioned. The addition of a small quantity of water precipitates the cocaine from its solution, and it is not until the water has become thoroughly incorporated with the hygrin that the precipitate is dissolved up. The addition of more water than the hygrin can dissolve precipitates the cocaine permanently, the latter, as is well known, being only slightly soluble in water.

As regards the physiological action, I found that

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, April 13.

amorphous cocaine and its hydrochlorate produced the same effects as the pure substances, the activity being proportionately detracted from by the amount of hygrin present.

There is, however, one very important difference. In using amorphous hydrochlorate of cocaine to cause anæsthesia of the conjunctiva, it was observed that considerable irritation followed, this being without doubt due to the hygrin.

A few drops of a 10 per cent. solution applied to a rabbit's eye caused almost immediate dimming of the cornea, and marked hyperæmia of the palpebral conjunctiva. Next day there was a large superficial ulcer on the cornea. The bad effects of such a solution are therefore very severe.

A 5 per cent. solution also caused very rapid dimming of the cornea, but not so much conjunctival inflammation. Two and a half per cent. solutions caused easily observed irritation, while it was difficult to observe any marked bad effects from the application of weaker solutions, although they are no doubt present.

By distilling the crude amorphous cocaine with water I obtained a few drops of hygrin, and found it to be an extremely irritating substance. It seems to have no special action beyond the local one.

Chemically, the decomposition products are the same as those of the pure alkaloid, the presence of hygrin only slightly complicating matters.

If amorphous cocaine be heated in a capsule on the water-bath for a prolonged period it slowly disappears—benzoyl ecgonin having been formed, and having dissolved up in the water. The resulting solution is clear yellow in colour, acid in reaction, and smells of benzoic ether and hygrin. On evaporating it, a brown, amorphous, hygroscopic mass remains, in which, after standing for several days, crystals form. It may be decolorized by treating with animal charcoal, but never forms good crystals. Chemically and physiologically it resembles benzoyl ecgonin.

Amorphous cocaine also changes spontaneously into benzoyl ecgonin. A specimen which had been put aside for six months was found at the end of that time to consist very largely (about one-half by weight) of benzoyl ecgonin in the form of acicular crystals. These crystals can be dissolved out by hot water, which takes up at the same time a very small quantity of the cocaine. When heated in a sealed tube with strong hydrochloric acid it undergoes the same decomposition as pure cocaine does—forming ecgonin, benzoic acid and methyl alcohol—but the hygrin discolours all the products. When pure cocaine is so treated no alteration in colour results, while, with the amorphous substance, there soon separates out a dark brown, oily-looking body, most of which floats to the surface, or collects in globules on the sides of the tube. The tube is opened and its contents washed with ether to remove the benzoic acid. On evaporating the ether yellowish crystals of benzoic acid are left, which may be obtained quite pure by sublimation.

The hydrochloric acid solution may then be evaporated to dryness in a capsule on the water-bath, when a dirty brown residue is left, consisting of the hydrochlorates of ecgonin and hygrin. The latter is very soluble in absolute alcohol, the former very sparingly so, and may thus be obtained pure by repeated washing. By decomposing the salt with silver oxide we get pure crystalline ecgonin.

It is almost impossible to obtain crystalline from amorphous cocaine by any of the methods at present in use for separating one body from another. I did get it twice in very small amount, but as the process I used was too wasteful and too complicated to be of any practical use I need not detail it here.

The most generally successful method is to dissolve a tolerably pure specimen of the amorphous hydrochlorate in chloroform, and then precipitate it with ether. The hygrin subsides to the bottom of the test tube much more quickly than a part of the cocaine salt does. On pouring off the supernatant fluid before the cocaine has all settled, and allowing it to evaporate, a gummy mass remains, in which after some days crystals of hydrochlorate of cocaine form, if there be not too much hygrin present.

Solutions of the amorphous hydrochlorate in water give the same reactions as the crystalline hydrochlorate with platinic chloride, mercuric chloride, tannin, and the ordinary reagents for alkaloids. Its behaviour with caustic alkalies, their carbonates and bicarbonates, and with lime and baryta water is very different, however. When any one of these is added to a solution of crystalline hydrochlorate of cocaine there occurs a milky precipitate, which is soluble in excess of the reagent. In the case of ammonia, after standing for a minute or two the cocaine is redeposited from the solution in the form of transparent, delicate, acicular crystals; with all the others the solution is permanent.

When, on the other hand, the alkaline solution is added to a solution of amorphous hydrochlorate, there occurs a milky precipitate mixed with floccules, but only soluble to a very slight degree in enormous excess of the reagent. The floccules especially persist.

This explains the different statements which have been made with regard to the solubility of cocaine in those alkaline solutions, as it is now obvious that in some cases a pure and in others an amorphous specimen has been tested. It is a curious fact, first called attention to by Squibb, that the well-formed large crystals are less soluble in chloroform than the ill-formed small ones. This difference in solubility I found to be due to the amount of hygrin present, the less hygrin there is the less soluble is the salt. In comparing a very pure specimen of the crystalline with a specimen of the non-crystalline hydrochlorate I found that the difference in solubility holds good for various solvents and is very marked. The solubility of the former in chloroform, absolute alcohol, and amylic alcohol was respectively about 1 in 48, 1 in 34, and 1 in 70, while the latter was soluble in the same menstrua in the proportion of about 1 in 5, 1 in 3, and 1 in 8. With other solvents there is also a difference, but not nearly so striking.

Hydrochlorate of amorphous cocaine reduces solution of potassium permanganate very rapidly, generally in a few minutes after being added. The purer the salt, the less rapid is the reduction, but all the samples which I have as yet tried cause reduction within several hours. Whether a perfectly pure salt would do so, or not, I am unable to say.

The purer the salt is, also, the less does it colour strong sulphuric acid.

Good hydrochlorate of cocaine, therefore, should be entirely crystalline, colourless, odourless, and very slightly soluble in chloroform or absolute alcohol. To free it from the amorphous salt, ad-

vantage may be taken of the great solubility of the latter in menstrua in which the crystalline hydrochlorate is very slightly soluble.

I frequently found that specimens which seemed to contain no hygrin gave indications of its presence on being decomposed with hydrochloric acid, and no specimen which I have yet examined was perfectly free from it. It may be said that the amount of hygrin present in a 5 per cent. solution of hydrochlorate of cocaine is practically of no importance, but if larger quantities are distinctly irritating, smaller ones will certainly be also, although perhaps not to a noticeable degree.

In conclusion, I may perhaps be permitted to offer a few criticisms on a recent elaborate paper by Dr. Squibb on the hydrochlorate of cocaine (*Ephemeris*, vol. iii., Jan., 1887), more especially as his views will probably influence the manufacture of cocaine in America and in this country, and as he is unaware that the non-crystallization of the salt is due to an admixture of hygrin.

(1) His method of assaying the leaves, as well as his process of manufacturing hydrochlorate of cocaine, extracts a certain amount of hygrin along with the cocaine.

(2) In describing the ultimate crystallization from alcohol he says that there first separates out a crop of large perfect crystals, leaving behind a gummy residue in which, after several days, less perfect crystals form. It is evident that this second crop contains a considerable admixture of hygrin and should be wholly or partly rejected. Instead of doing so, however, he utilizes the whole by stirring the alcoholic solution while evaporating, thus forming a granular salt. Dr. Paul has already protested against this method of preparing the hydrochlorate of cocaine (*Pharm. Journ.*, Feb. 12, 1887), and states that it can easily be made in the form of large perfect crystals.

(3) Dr. Squibb states that the imperfect crystals are therapeutically as active and give as good results as the perfect crystals. I think I have shown, however, that any admixture of hygrin diminishes its activity and makes it irritating.

(4) Judging from its solubility in chloroform, and from its action on permanganate of potash solution, I seem to have used as a standard a much purer salt than any of those which he examined. In fact, all his specimens seem to have been of only medium quality.

[*The discussion on this paper is printed on p.* 873.]

SOLUBILITY OF GELATINE AS COMPARED WITH OTHER PILL COATINGS.*

BY THOMAS THOMPSON.

The subject I have taken up, viz., the solubility of gelatine as compared with other kinds of pill coating now adopted, is not of a scientific nature; but I trust it may be of sufficient interest for me to claim your attention for a short time. My principal reason for choosing this subject I will give you as briefly as possible.

Some time ago, when in conversation with an Edinburgh gentlemen on the merits or demerits of gelatine pill coating, it was hinted that such a coating was not a desirable one, because after a time the gelatine practically altered in composition and became hard, horny and insoluble. One of our eminent medical men also spoke of it to me, in the same terms; fortunately, he had time at his disposal, and I had the satisfaction of proving to him that such was not the case.

I took a gelatine-coated pill that had certainly been made over two years, and dropped it into a glass containing water at a temperature of 95° Fahr.

In a few seconds, without having used any motion, the gelatine could be seen dissolving and mingling with the water as it rose from the surface of the pill.

When stirred the entire coating was quickly dissolved, indication of such being given by the disintegration of the pill in a most satisfactory manner.

The idea which appeared to have possessed both of these gentlemen was, that the process of heating the gelatine, for the purpose of pill coating, had the effect of decomposing it to such an extent as to produce the consequences before stated.

Now, if a moment's thought be given to the subject the fact will become apparent that heat must, in the first instance, be used for the manufacture of gelatine, or it would not be possible to produce a sheet of it, in such a form as the one at present on the table.

This must certainly have been in a semi-fluid state at first, to allow of its being run out into such sheets and afterwards dried by evaporation. Yet this gelatine will keep in the same condition, if necessary, for several years, and would be equally soluble then as it is now.

I compare the gelatine coating of a pill with this sheet of gelatine, it having been made into a solution with water for the purpose of application to the pill; the water is removed by evaporation, leaving over the pill a coating of pure gelatine, which will to my mind be as soluble in the future as the sheet of gelatine is to-day.

It is needless to say in the face of this, that I failed to see the force of argument used.

From these circumstances the idea struck me that a few experiments would prove the solubility of gelatine coating as compared with other kinds of pill coating.

For this purpose I obtained samples of the various kinds of coated pills such as are sent out commercially and are known as pearl, sugar, gelatine, tolu and keratine.

For my first experiment I selected the aloes and iron pill, in sugar, pearl, gelatine and tolu.

The sugar, pearl and gelatine were obtained from leading manufacturers and may be termed factory-made pills; one of gelatine and one of tolu were made and coated by myself.

For experimenting with, I had one of sugar, three of pearl, two of gelatine, and one of tolu. These were numbered from 1 to 7.

The plan adopted was to drop one of each into a weak solution of red prussiate of potash, at a temperature of 95° F., about the ordinary temperature of the body, and whichever, after once stirring, gave the blue precipitate first, was deemed to be enveloped in the most soluble coating.

In order to make the test in every way a fair one, the needle hole in the gelatine-coated pill was closed.

Time taken to Exhibit Blue Precipitate.

No. 1. *Sugar.*—Showed precipitate in six minutes.

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No. 2. *Pearl.*—In twenty-three minutes, after having been kept at a temperature of 100° F. for eighteen minutes.

No. 3. *Pearl.*—Outer coating fell away after keeping at a temperature of 100° F. for twenty-five minutes, and showed precipitate after two hours and fifteen minutes.

No. 4. *Pearl.*—In three hours and fifty minutes.

No. 5. *Tolu.*—In one hour and three quarters the precipitate was only shown at points, as if the moisture and heat had caused the pill to swell and burst the coating.

No. 6. *Gelatine.*—In one and a half minutes.

No. 7. *Gelatine.*—In four minutes.

In regard to gelatine coating, it became apparent that the consistence of the solution had much to do with the more or less ready solubility of the coating, as evinced by Nos. 6 and 7.

Having by these simple experiments shown that the gelatine-coated pills had by far the most soluble coating, I thought it might be interesting to know how long it would take to produce perfect disintegration of each one. For this purpose the glasses and their contents were kept in a drying closet at a temperature of 100° F. and occasionally stirred; the result was as follows :—

No. 1. *Sugar.*—Took one hour and forty minutes.

No. 2. *Pearl.*—Took four and a half hours.

No. 3. *Pearl.*—Took five hours.

No. 4. *Pearl.*—Was a pill next morning.

No. 5. *Tolu.*—Took some time, showing that although the coating had yielded at certain places, such a coating would retard the action of the pill, as disintegration did not take place for three or four hours with a freshly-made pill.

No. 6. *Gelatine.*—Took thirty minutes.

No. 7. *Gelatine.*—Took one and a quarter hours. (Quinine pills with chloride of barium).

The great difference evinced in the time at which the precipitate appeared on the surface of the pill shows, I think, that some other coating had been used previous to the commencement of the pearl coating, and consequently would have the effect of retarding the action of the pill in the same degree of difference. The length of time taken to produce disintegration can only point to one conclusion, that in order to have the pills in a proper condition for pearl coating they must be made as hard as it is possible to make them, which in the case of gelatine coating is not necessary.

I think the results of my experiments prove conclusively that the gelatine-coated pill has the advantage in every respect, and that factory-made coated pills are not desirable adjuncts to a chemist's business.

The very fact of having to make them so hard before coating shows most clearly that it is not possible to adhere strictly to the B.P. formula. I am sure none of the formulæ given in that volume would produce pills so hard, as some samples I have here. I quite agree with Mr. Gilmour that a chemist should not encourage the sale of factory-made pills, not only for the reason I have endeavoured to point out, but also for his own benefit in securing what middle profit there may be.

When a chemist takes to the sale of such pills for the purpose of saving himself trouble, I think he sinks below the dignity of his profession, and further, he deprives the rising generation of pharmacists of a most important and practical part of their education. Again, he could not give a guarantee as to the accuracy of the composition of the pills, as he could were the pills made by himself.

With reference to the B.P. pills I think the gelatine coating is applicable to all of them; not always so satisfactory in appearance, because there are some, such as pil. coloc. co., lead and opium, etc., where they present a dull appearance. With these exceptions the coating remains intact, and, unlike pearl coating, does not show any pitting or discoloration; it is in every case readily soluble.

The keratine coating is of more recent introduction, and is made, as no doubt you are all aware, by removing from horn shavings all that is soluble in pepsine and hydrochloric acid. The residue is dissolved in solution of ammonia and evaporated until only a trace of ammonia is left.

The idea is to form a coating that would be insoluble in the gastric juice of the stomach and reserve the action of the ingredients until the pill reaches the alkaline liquids in the intestines.

I obtained some keratine-coated aloes and iron pills from London and subjected them to the same treatment as the previous ones. The blue precipitate was given in eighteen minutes, and total disintegration took place in three hours. I do not say the coating was dissolved, but, as in the tolu-coated pill, I think the moisture and temperature had the effect of bursting the coating and liberating the contents of the pill. From this, one may almost conclude that the same action would occur when such pills are taken into the stomach. I feel sure pills coated in the same way as some of these I have here, would be much more likely to pass the stomach unaltered than the keratine-coated pills.

A second series of the before-mentioned pills were subjected to a similar experiment, but with an acidulated solution of pepsine, with practically the same results.

A short time ago, I was asked by Mr. Hill to allow my gelatine pill-coating and capsule-making machine to be exhibited. At that time I was engaged in making these several experiments in pill-coating, and as the two are so closely connected, I thought I might read a short paper on the superiority of gelatine pill coating, and exhibit my machine at one and the same time; feeling I could better describe the latter than a stranger could have done. Before the close of the meeting I shall endeavour to practically illustrate its capabilities and method of working to any gentleman who may feel interested in seeing it.

[*The discussion on this paper is printed on p.* 873.]

NOTE ON BLAUD'S PILL MASS.*

BY THOMAS THOMPSON.

I gathered from the last Evening Meeting that there has hitherto been a great diversity of opinion as to whether the chemical action of the constituents of Blaud's pills should take place before or after administration.

It has occurred to me the intention of the inventor must have been that the combination should be introduced in such a form that chemical reaction should take place after administration, as no doubt this would produce the carbonate of iron in the most active condition for absorption by the system. Otherwise I cannot help thinking it would have

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, April 13.

been just as beneficial to have given saccharated carbonate of iron pills.

This subject was freely discussed at the time, and during Mr. Nesbit's remarks he referred to the possibility of the hydrochloric acid always present in the gastric juice attacking a Blaud's pill so soon as it enters the stomach, and forming a portion of chloride of potassium, thus preventing a certain amount of action between the potassium carbonate and ferrous sulphate. In answer to this theory Dr. Clark pointed out that the action of the two salts commenced in the centre of the pill, so that carbonate of iron would to a large extent be formed before the pill reached the stomach, consequently the hydrochloric acid would have little chance. From Dr. Clark's remarks, and thinking over these theories, I gathered that the spontaneous reaction was due to the presence of water of crystallization, and therefore it was scarcely possible to prevent it before the pills could be taked by the patient.

The water of crystallization being the drawback to the proper administration of the medicine, the idea suggested itself to me of using dried sulphate of iron and anhydrous potassium carbonate.

One and a half grains of the dried sulphate of iron equals 2½ grains of the ordinary sulphate—and 1¼ grains of anhydrous carbonate of potassium equals 1½ grains of the ordinary carbonate—and these quantities are the exact chemical equivalents which will produce ferrous carbonate, and are the correct proportions for producing an ordinary Blaud's pill.

The next thing was to obtain an excipient free of moisture, and thus prevent decomposition until the pills should reach the stomach.

I made some pills composed of—

Dried sulphate of iron	36 grains.
Anhydrous carbonate of potassium .	30 grains.
Sugar of milk	25 grains.
Pulv. tragacanth.	10 grains.
Ol. ricini	q.s.

To make 24 5-grain pills.

The result was a soft mass, not easily rolled out. I succeeded so far as to produce the pills I have here, and after standing for forty-eight hours they were coated with gelatine, then set aside for fourteen days; after which careful estimation proved four of them to contain 6 grains of the dried sulphate of iron, B.P., this being the exact quantity introduced into the four pills, clearly showing that no oxidation whatever had taken place, and is equal to 20½ per cent. of anyhydrous ferrous carbonate.

Carrying still further my idea of using the dried salts, the next experiment was to introduce the ingredients into capsules. I calculated that 4½ grains of dried sulphate of iron and 4 grains of anhydrous carbonate of potassium would practically represent three ordinary Blaud's pills.

With these weights, and taking into consideration the capacity of the capsule used, it was easy to arrive at a working proportion.

A given quantity of each ingredient was taken and incorporated separately with a sufficient quantity of almond oil, so that when mixed the combined product was sufficient to fill a certain number of capsules, so that each one would represent three ordinary Blaud's pills.

There are samples on the table of two sizes. The small ones are equal to one, the larger to three Blaud's pills.

I set aside several of these for fourteen days, after which two of the larger ones were dissolved in hot water and carefully estimated; the result being highly satisfactory, each capsule was found to yield equal to 4½ grains of dried ferrous sulphate, clearly showing there had been no oxidation whatever, and, as shown in the pill mass, is equal to 20½ per cent. of anhydrous ferrous carbonate.

This is the exact proportion that should result from the decomposition of three ordinary Blaud's pills, provided no oxidation had taken place, which in the case of the ordinary Blaud's mass would be impossible.

I venture to think that this system of administering Blaud's ferruginous mass would carry out what must have been the original idea, in a satisfactory manner.

The pills as you will see are coated with gelatine, and may be kept for an almost unlimited period without any decomposition taking place.

[*The discussion on this paper is printed on p.* 873.]

NOTES ON BLAUD'S PILLS.*

BY PETER BOA.

I almost feel as though it were necessary for me to apologise for introducing a subject which has already been so ably treated during this session in this house.† Apart from Mr. William Duncan's valuable contribution to the subject the matter has been on two other occasions the subject of incidental discussion, once at a meeting of the Assistants' Association and again at the last Evening Meeting in connection with Mr. Gilmour's paper on pill coating. The points raised had relation principally to—

I. The form in which the iron should exist in the pills.

II. The best method of preparing them.

III. The desirability or non-desirability of coating the pills.

It may be that I have not anything new to advance in regard to any of these points. It seemed to me, however, that one or two things in connection with them might, with advantage be emphasised, and as Mr. Thompson was to have a note on the subject to-night I thought the present occasion a favourable one for unburdening myself of anything I have to say in regard to the matter.

First, then, in regard to the state in which the iron should be. To my mind there does not appear any reason to doubt that the intention of the originator of the formula for these pills was to administer by means of them ferrous carbonate. The original formula, which I believe is—

Ferri sulph. potass. carb.	āā ℥ss.
Pulv. althææ	gr. 30.
Tragac.	q.s.

cannot be made up without formation of ferrous carbonate, in fact conversion of nearly all, if not the whole, of the sulphate into carbonate.

Mr. Duncan remarks in his paper that many pharmacists believe that the reaction should take place in the stomach while the pill is being disintegrated, and they prepare the pills with a view to preventing decomposition in the mortar. This belief is not confined to pharmacists.

In a 'Manual of Gynecology,' by Hart and Bar-

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† "Blaud's Pills," by W. Duncan (*Pharm. Journ.* March 19, 1887, p. 775).

bour, page 543, there is a note as follows:—"Blaud's pill gives a ferrous carbonate and a potash salt, the decomposition taking place after the pill is swallowed." In connection with this note the undernoted formula is given, which is said to be that of a well-known firm:—

Potass. carb. sicc.	15
Ferri sulph. sicc.	15
Pulv. acaciæ	3
Syrup	9

Made into 5 grain pills.

So far as my experience goes I think Mr. Duncan is right in his supposition that the majority of pharmacists, and I may add medical men, believe Blaud's pills ought to contain ferrous carbonate when administered to the patient.

Assuming then that the pills should contain ferrous carbonate the next consideration is, What is the best method of preparing them so as to obtain the greatest amount of this?

In the course of my experience in making these pills, I have tried many variations of the original form with as many varieties of results. Before giving the formula to which I now adhere, I may as well briefly indicate the different stages in its evolution. Starting with the formula of 30 grains each of ferrous sulphate and potassic carbonate and 3 grains of tragacanth to make one dozen pills, I found that oxidation rapidly took place, and in a very short time little or no ferrous carbonate remained; the pills, too, became hard and insoluble. A physician told me the other day that he had known pills made in this way for hospital use pass through patients undissolved. The addition of sugar was tried, but with full quantity of the other ingredients the pills were too bulky. Finding on calculation that the potassic carbonate was in excess I left out some of it, and made up the difference with sugar; this gave better results as regards keeping, but still the pills became damp on the outside, and required frequent touching up to keep them presentable. During this time I had been using crystallized ferrous sulphate. Accidentally the granulated sulphate was on one occasion used, and this batch of pills was excellent. They looked well, and kept well. The mass was observed to be much firmer. Afterwards the granulated sulphate was always used, and with equal satisfaction. When it is borne in mind that crystallized ferrous sulphate and the granulated sulphate have both the same composition, viz., $FeSO_4 \cdot 7H_2O$, inquiry naturally arises as to why one should give a different result from the other. The two sulphates which I have been using are the manufacture of the same firm, which is one of the very highest reputation for pharmaceutical chemicals; on volumetric estimation—

The crystals gave . . 54·73 per cent. $FeSO_4$.
The granulated gave . 57·0 „ $FeSO_4$.

or a difference of 2·27 per cent. Both samples apparently contain more than the theoretical amount of $FeSO_4$ which is 54·68 per cent. There is usually, however, a slight error in excess in volumetric estimations. The 2·27 per cent. of difference between the two was not borne out by drying a quantity of each and ascertaining the loss of water; in this way the difference was only slightly over 1 per cent. The Pharmacopœia test indicates about 1 per cent. more $FeSO_4$ in the granulated than the crystallized sulphate; the extra 1·27 per cent. was probably accounted for by slight oxidation of the crystals which change more rapidly than the granules.

Both samples appear to be practically $FeSO_4 \cdot 7H_2O$. The crystals give a much softer mass than the granules, softer, too, than the granules give with 3 per cent. (more than the ascertained difference) of water added. It would appear, therefore, that there is a physical difference between the water in the crystals and that in the granules. On comparison of external appearance the crystals have a somewhat moist look, while the granules are dry. Probably the water of crystallization is more loosely combined in the former than in the latter. This idea is corroborated by several circumstances: for example, the crystals get brown spots of rust on them much more readily than the granules; and if the behaviour of the two salts when being dried be observed, it will be seen that the crystals, on application of heat, melt and cake, whereas the granules never aggregate, but gradually effloresce and fall to powder. The tendency of the crystals to rust follows them into the pills, which acquire brown spots on the surface more rapidly when made from them than from the granules. As a result of my observations I believe it is a matter of primary importance that granulated ferrous sulphate should be used in preference to the crystallized salt in the preparation of Blaud's pills. I have not been able to find a record of any previous observations on this point, but my experience conclusively indicates the superiority of the granules over the crystals, even although both be practically identical in composition.

The formula which I find gives a constant and satisfactory result is as follows:—

Granulated ferrous sulphate, B.P. .	30 grains.
Potassic carbonate (15 to 16 p.c. H_2O)	20 „
Powdered sugar	10 „
Powdered tragacanth	3 „

Rub the iron and sugar together, then add the potash, and after trituration add the tragacanth and beat into a mass for twelve pills. The beating required is considerable, but nothing else is needed to make a mass which rolls easily if not allowed to lie.

This formula approximates closely to No. 2 (called Martindale's) in Mr. Duncan's paper. I prefer to use 20 grains potassic carbonate rather than 18 grains, however, because 17·8 grains of the salt containing 16 per cent. of water are required to completely decompose 30 grains ferrous sulphate, and it is desirable to have the alkali with a greater margin of excess. Each pill theoretically contains a little over 1 grain of ferrous carbonate.

In regard to the coating of these pills I have only a few words to say. The object of coating a pill is either to preserve it or cover its taste. When properly made Blaud's pills keep for any reasonable time with only a very trifling loss of ferrous salt; they are to all intents and purposes tasteless, any perceptible taste they may have is not objectionable. It appears to me, therefore, unnecessary to coat them. It is, besides, just possible that coating may be an objection in the case of pills that are taken in such numbers, from nine to eighteen being a common daily dose. Mr. Gilmour told us at the last Evening Meeting that he had examined pills, 30 per cent. of which was coating. If the pills were not potent, it would be hard to say in such a case whether they or the coating would be the active agent.

[*The discussion on this paper is printed on p.* 873.]

UNCOMBINED ALKALI IN SOFT SOAP.

AN UNSUSPECTED REACTION EXPLAINED.

BY HARRY NAPIER DRAPER, F.C.S.

Dr. Redwood (*Pharm. Journ.*, xvii., p. 742), speaking of the soft soap of the Pharmacopœia, says:—

"What has very much surprised me has been that all the samples I have examined have been free from uncombined caustic alkali, as indicated by the addition of a drop of phenolphthalein to a cold filtered solution of the soap."

and again (p. 754):—

"Once or twice he had been deceived upon dissolving the soap in rectified spirit, and pouring off the clear part and adding the phenolphthalein to it. In that way he at once got a deep reddening, but he had never met with any sample in commerce which, if carefully filtered after being dissolved, gave any indication with the phenolphthalein test."

This result, however, must not be taken as at all indicating that a given specimen of soap is free from caustic alkali, and those for whom the subject has more than a passing interest may be referred to a recent paper in the *Chemical News* (lv., p. 143, April 1, 1887) in which are detailed some of the phenomena attendant upon the presence of alcohol in a liquid also containing phenolphthalein and a fixed alkali.

In the experiments of Dr. Redwood either of two things might have occurred:—

(*a*) The soap might have contained a trace of free alkali, reddening phenolphthalein, but this during the filtration would absorb carbonic acid and be thrown out of solution as carbonate, or,

(*b*) The water present in the soap would enable the alcohol to take up enough carbonate (even absolute alcohol at 100° dissolves enough potassium carbonate to deeply redden phenolphthalein) to give the reaction, but this on cooling during filtration would equally be eliminated from the solution.

And in either case, if the quantity of uncombined alkali or of carbonate were but small, the alcohol would so rapidly absorb carbonic acid as to produce a bicarbonate, which, as is well known, has no colouring action upon phenolphthalein.

As a matter of fact, when an ordinary sample of Pharmacopœial soft soap is dissolved in cold rectified spirit, the unfiltered solution reddens phenolphthalein and the filtered solution does not. If to the filtrate a trace of dry potassium carbonate be added, the liquid again colours the reagent, and when once more filtered passes coloured through the filter. If the flask containing the filtrate be shaken, the colour becomes gradually fainter and fainter, and if breathed into and again agitated the colour disappears entirely and so suddenly as to make the reaction, minus the soap and with nicely graduated solutions, form as striking a lecture experiment as can be well imagined.

It is probable that traces of both potassium hydrate and carbonate are present in even the best specimens of sapo mollis, B.P.

AN EXAMINATION OF THE LEAVES OF GYMNEMA SYLVESTRE.*

BY DAVID HOOPER.

Gymnema sylvestre (R. Br.) is an asclepiadaceous plant growing in the Deccan peninsula, from Concan to Travancore; it is also met with in Assam and on the Coromandel coast, and is distributed in the African continent. It is a stout woody climber with long slender branches. Its name in Tamil is sim-

* Paper read before the Nilgiri Natural History Society, Ootacamund. Communicated by the Author.

kurinja, in Malay alum chem-kecriûûi; these names refer to a "small hilly" plant.

The leaves are opposite, entire, from 1½ to 3 inches long and from 1 to 2 inches broad, elliptic or obovate, acute, rounded or pointed rarely cordate at the base, thinly coriaceous, both surfaces shortly pubescent or puberulous, the upper darker than the lower surface.

Gymnema sylvestre is mentioned in the non-official list of the Indian Pharmacopœia, 1868; and in Dr. Dymock's 'Materia Medica of Western India.' The powdered root has for a long time been known among the Hindus as a remedy for snake-bites; in such cases it is applied locally to the part affected and also taken internally in the form of a decoction. The most curious circumstance connected with this plant was first noticed by Mr. Edgeworth, who discovered that by chewing some of the leaves it destroyed the power of the tongue to appreciate the taste of sugar; he found that powdered sugar, taken immediately after masticating some of the leaves, tasted like so much sand in his mouth, and this effect lasted for twenty-four hours. Dr. Dymock regarding this property said he was unable entirely to confirm this statement, his experience was, that sugar taken into the mouth immediately after chewing the fresh plant had a saltish taste, but was still easily recognizable. Some leaves from an authentic source were procured by Mr. Lawson, who placed them at my disposal for chemical examination. They had a bitterish astringent and slightly acid taste; after chewing one or two leaves it was proved beyond doubt that sugar had no taste immediately afterwards; a saltish taste is experienced if too small a quantity of the leaf is used. Sugar in combination with other substances in dietetic articles is plainly destroyed as to its taste after using these leaves; in ginger-bread, for instance, the pungency of the ginger is alone detected, the rest is tastless meal; in a sweet orange the taste of the sugar is so suppressed, and that of the citric acid consequently developed, that in eating it resembles a lime in sourness. Among the several kinds of foods, drugs and beverages which affect the palate Gymnema leaf does not profess to render them all tasteless; it does not affect pungent and saline things, nor astringents and acids. It is limited apparently to two diverse substances, sweets and bitters; it has been noticed that sugar taken after the leaf tastes like so much sand, so I have found that quinine sulphate taken after a good dose of the leaf tastes like so much chalk. I am not going to propose its use in the administration of nauseous drugs until the medical properties of the Gymnema have been more studied, otherwise the quantity of the vehicle taken may prove to counteract the effect of the medicine. The experience of several friends, as well as my own, is that the effect peculiar to the leaf does not last twenty-four hours, as stated, but for only one or two hours; after that time the tongue resumes its appreciation of all that is sweet or bitter.

A quantity of the leaves obtained from Guindy Park, Madras, were sun-dried, and reduced to fine powder. By boiling with water and distilling no aroma was perceived, and nothing volatile was condensed. The powdered leaves were submitted to the action of various solvents, and by this means it was ascertained that the peculiar property of Gymnema leaves was dissolved out by alcohol, and as it occurred in the aqueous extract of the residue, it was therefore soluble in water. As benzine and

ether took from the powder certain principles of the same appearance and weight, it was conceived that nothing would be gained by using both solvents; the preliminary examination was therefore made with ether previously rectified from spirits and water. The ether extract consisted of chlorophyll and two resins separated by their solubility in alcohol. The resin insoluble in spirit formed the larger portion; it was soluble in chloroform, bisulphide of carbon, and benzine. It was elastic and tenacious, decomposed by warming with nitric acid, the product being precipitated with water, and only partially saponified with caustic potash. Sulphuric acid dissolved it in the cold, giving a green solution. It seemed to consist principally of a neutral resin. The resin soluble in alcohol was readily saponified with soda, and gave a permanent greenish-blue colour with sulphuric acid; like the former resin it was of an acid nature, and left a tingling sensation in the throat.

The alcoholic solution of the leaves was almost entirely soluble in water; in fact by treating the leaves separately by alcohol and water 36·37 per cent. organic matter was extracted, and by treatment with water alone 36 per cent. was removed. By direct experiment it was found that 0·47 per cent. was an acrid resin similar to those found in the ether extract. The aqueous solution of the substances soluble in alcohol had a decidedly acid reaction; it gave no coloration with ferrous or ferric salts, showing absence of tannin. It was not precipitated with Löwenthal's gelatine-salt solution. It was deepened in colour by alkalies, but gave bulky precipitates with sulphuric, nitric, hydrochloric and acetic acid. It reduced Fehling's solution on boiling, gave a cloudiness with Nessler, a grey precipitate with lead acetate, but none with picric acid or tannin. The precipitate caused by sulphuric acid was collected on a filter and washed until it ceased to give a cloudiness with barium chloride. This yielded when dry a greenish powder, insoluble in water, but soluble in alcohol, ether, benzine and chloroform. With potash, soda and ammonia it afforded a fine red solution with orange coloured froth, but this was thrown down on the addition of the mineral acids. It dissolved in concentrated sulphuric and nitric acids with intense red colour, but in both mixtures it was destroyed by water. It fused at about 60° C. into a brittle blackish mass. Heated in a test-tube it gave off fumes of creasote, but no crystals were obtained in a subliming apparatus. Gently ignited it first fused, then intumesced, and burnt with a bright flame leaving no ash. It was thrown down as a bulky grey precipitate by acetate of lead; the lead salt decomposed by sulphuretted hydrogen in water left the substance in the evaporated reddish filtrate from the lead sulphide. The body just described has the characteristics of chrysophanic acid; but it having some distinctly peculiar reactions, and possessing the anti-saccharine property ascribed to the leaves under examination, I propose to call it *gymnemic acid*.

Gymnemic acid forms more than 6 per cent. of the constituents of the leaves in combination with a base which has not been isolated. Another organic acid was present in the lead acetate precipitate which was identified as tartaric acid. The filtrate from the insoluble lead compounds was treated with sulphuretted hydrogen gas, and the clear liquor after evaporation was examined for sugar. Glucose was recognized in some quantity by its immediate and abundant reduction of copper in Fehling's solution. The sugar, examined in the tube of a polariscope, had a left-handed rotation.

Chloroform agitated with an alkaline solution of the leaf left a crystalline residue of brownish colour, it had a bitter taste, and produced a flow of saliva. With the ordinary alkaloidal reagents it afforded a distinct precipitate, but it was a neutral principle. Its real nature and properties, as well as those of gymnemic acid, are reserved for a future investigation. The leaves, after being exhausted with ether and alcohol successively, were treated with water. The gum was separated and estimated by spirit in the usual manner. A carbohydrate, still more insoluble in spirit than gum, was found in this extract. It reduced Fehling's solution after prolonged boiling with acid, and was optically inactive.

Diluted soda removed a brownish liquid which consisted of albuminous matters, not all of which was rendered insoluble by alcohol and acetic acid. These were not weighed, but calculated by difference.

A solution of one per cent. hydrochloric acid was employed to remove the oxalate of calcium. A microscopical examination of the powdered leaves showed a fair amount of the conglomerate raphides, in that peculiar crystalline form known to exist in rhubarb. The dilution of the acid menstruum rendered this process very tedious, so a stronger acid was used, and the marc washed until ammonia produced no cloudiness with the acid solution. The collected alkaline liquors were allowed to subside, and the sediment was collected on a filter, dried and weighed, then incinerated and weighed again. The calcium carbonate was calculated into oxalate, and the difference between this and the first weighing was reckoned as pararabin. No oxalic acid was found in the free state.

The ash of Glymnema leaf is very high, a fact in accordance with the amount of lime salts. Gentle ignition of the air-dried leaves left as much as 11·65 per cent. and about one half of this was calcium carbonate. One hundred parts contained—

15·41	soluble in water.
78·71	soluble in acid.
5·88	sand and silicious residue.

The cellulose was estimated by steeping the leaves in sulphuric acid of sp. gr. 1·50 for thirty hours, washing, drying, weighing, burning and deducting the ash; this result did not differ materially from the weight of the totally exhausted powder treated with chlorine water and estimated with the usual precautions.

The following is the tabulated analysis of the *Gymnema sylvestre* previously dried in the sun and powdered :—

Ether extract (chlorophyll and resins). .		5·51
Alcoholic extract (gymnemic acid, tartaric acid, glucose, neutral bitter principle, etc.)		19·50
Aqueous extract (gum 1·45 per cent.), glucose, carbohydrate and extractive .		16 87
Alkaline extract, by difference (albuminous and colouring matters)		8·15
Acid solution	calcium oxalate. . . .	7·64
	pararabin	2·74
Ash (balance of)		5·69
Cellulose.		27·86
Moisture		6·04
		100·00

NEW COMPOUND VALERATES.*

BY R. ROTHER.

There is a considerable number of strictly monobasic acids which generate multiple and acidic salts that are the exact analogues of compound salts derived from polyhydronic radicles. That some mode of chemism not expressible in unit valence binds the molecules together is undoubted. The writer has heretofore in explanation of this state assumed a coalescence dependent upon fractional bonds and preferably assigned this union to the basic rather than the acidic part of the saline compact. But the writer now believes that a more comprehensive view of the case results by assuming a polymerization of the implicated acidic radicle. Thus taking, for instance, a double molecule of chlorhydric acid and representing it by $H_2(Cl_2)$ we may replace half the hydrogen by a quinium residue and obtain acidic quinium chloride $(QuH)H(Cl_2)$ an authenticated salt. When quinine as free base is added in excess to ferric chloride, ferric hydrate is precipitated. On adding chlorhydric acid just sufficient to dissolve the hydrate and then adding quinium chloride as long as combination results a chloride of iron and quinium is obtained which may be represented by $Fe(QuH)(Cl_4)$.

When its solution is evaporated spontaneously or with a gentle heat, the double salt remains as a nondeliquescent red-brown amorphous readily soluble mass. On a former occasion (*Pharm. Journ.*, [3], xv., 66) the writer stated that the crystallized ammonium valerate of the market is an acidic salt of valeric acid, but its exact composition was not ascertained. Recently the writer experimented with magnesium carbonate on this compound. From the proportion of carbonate then dissolved it was deduced to be a diacidic valerate having the formula $(NH_4)H_2(Va_3)$. The ammonium and magnesium valerate $NH_4Mg(Va_3)$ thus resulting has an exceedingly sweet taste, free from valeric flavour or bitterness. Its odour is but a faint reminder of its origin. It may be manipulated and exposed with impunity without tainting the atmosphere with the disagreeable aroma of valeric acid. This compound salt is extremely soluble, but can readily be obtained as a nondeliquescent crystalline mass on evaporating its solution to a syrupy consistence. Viewed under the microscope with a half-inch objective it is seen to be made up of spinules arranged in star-shaped groups. Its appearance in polarized light is very fine.

This salt is soluble in alcohol in all proportions, but the residue left on evaporation gives no satisfactory appearance under the microscope. When valeric acid is treated with excess of magnesium carbonate in the presence of water a solution of magnesium valerate results. This solution, whether concentrated or dilute, appears to be acted on by the carbonic anhydrate of the atmosphere, as a thin insoluble pellicle of magnesium carbonate soon covers the surface. In consequence the dry salt cannot be secured entirely free from this contamination. Nevertheless the salt gives a very satisfactory appearance with the microscope whilst the polariscopic effect is very pleasing. The crystals have the form of delicate branched wavy filaments emanating from a centre. This salt has an all-proportional solubility in alcohol, which solution leaves an amorphous residue. This with a half-inch objective and B eye-piece is seen covered with branched wavy striæ. The alcoholic residue differentiates no colours with the polariscope.

Magnesium valerate forms a compound salt with quinium valerate of extreme solubility in water and in alcohol. The aqueous solution is only stable when highly concentrated, since the addition of water at once precipitates the greater portion of the quinium salt. An aqueous solution containing some alcohol remains intact, whether strong or dilute. Such a solution can be heated with impunity during evaporation without separating quinium valerate, providing some alcohol is continuously present. Toward the last all the alcohol must be dissipated in order to permit crystallization. The dense residue when left at rest sets to a crystalline mass after some time. But if stirred for a short time after a rather dense pellicle has covered the surface congelation of the whole mass immediately takes place, leaving a perfectly dry salt. Its appearance under the microscope resembles that of magnesium valerate. The writer believes that the formula $(QuH)Mg(Va_3).x$ Aq. represents its composition.

Although magnesium valerate in aqueous solution suffers decomposition on exposure, the compound salts remain unaffected. In the dry state the compound salts are wholly odourless, whilst their solutions have but a feeble valeric odour; owing to their rather agreeable flavour and inobtrusive odour they commend themselves instead of the simple salts. The writer would suggest an elixir of ammonium and magnesium valerate.

Great convenience results from having in stock an aromatized liquor for general use in the preparation of elixirs. Such a liquor might be termed an alcarome. In a general way glycerin appears better applicable than sugar as a sweetening for elixirs. The mixture of three measures of alcarome with one measure of glycerin might then be appropriately designated as a glycarome.

The writer prepares alcarome by separating the shells from 3 drachms of cardamom and triturating the grains to a fine powder. One and a half troy ounces of coriander is then also finely powdered. The two powders are then mixed with ten drops of oil of cassia and ½ a troy ounce of powdered magnesium carbonate. This powder is now added to a mixture of 2 pints of alcohol and 4 pints of water. The whole is set aside for several days, well shaken at intervals, then poured into a filter, and the filtrate brought to the measure of six pints by the addition of enough (⅓) alcohol through the filter.

To prepare elixir, or rather glycarome of ammoniomagnesium valerate, 1 troy ounce of valeric acid is mixed with 6 fluid ounces of water and 125 grains of ammonium bicarbonate. After all the bicarbonate is added and decomposed an excess (about 3 drachms) of magnesium carbonate is incorporated during occasional stirring. One drachm of cochineal is now rubbed to a fine powder and mixed with a solution of the valerates. The mixture is then poured into a filter, ond when all the liquid has passed down, followed by alcarome until 24 fluid ounces of filtrate is collected. To this 8 fluid ounces of glycerin is added, and the whole well mixed.

* From the *American Journal of Pharmacy*, April.

NOTES ON ESSENTIAL OILS.

The Spring Report on essential oils and allied compounds, issued by Messrs. Schimmel and Co., of Leipzig, contains, besides much useful information as to stocks and prices, a number of interesting notes, from which the following are selected:—

Anise Oil.—The quality of the supplies of "1886" anise are said to be very unsatisfactory. About one half the samples have an admixture of brown fruit; and half the remainder contain more or less large swollen tasteless fruit, which Messrs. Schimmel believe to have been already submitted to distillation. This appears to constitute a new form of adulteration.

Valerian Oil.—Under this name a supply of essential oil has been received from Japan, apparently of good quality, and agreeing chemically and in respect to odour and taste with genuine oil of valerian. Nevertheless the oil is believed not to have been derived from the usual source, but from the root of *Patrinia scabiosæfolia*, Link., known in Japan under the name "Kesso." According to Holmes (*Pharm. Journ.*, [3], x., 22) the root itself has before now appeared in the London market. The odour of the root is described as being even more powerful than that of *Valeriana officinalis*.

Bay Oil.—The demand for this oil, which is used in the preparation of "bay rum," is said to be steadily

increasing on this side of the Atlantic. This has led to it being substituted sometimes by mixtures of the oils of pimento and laurel, from which it is, however, easily distinguishable by specific gravity and odour. The genuine distillate from the leaves of *Myrica acris* has a sp. gr. of 1·040, does not dissolve completely in an equal volume of absolute alcohol, and when mixed with an equal volume of strong solution of potash forms a semi-solid mass. It is mentioned that in consequence of the difficult solubility of this oil, "bay rum" is always turbid when prepared and should be carefully filtered.

Cajeput Oil.—The chief market for this article is Macassar, and the principal seat of its production is the island of Booro.

Camphor Oil.—Under the name of "light camphor oil" the firm has introduced into commerce, as a substitute for turpentine oil, the light-boiling fraction of the bye-product obtained in large quantities in the preparation of safrol. One advantage claimed for it is its relatively high flashing point which, with the barometer at 763 mm., is said to be 44·5° C., that of turpentine oil being given as 33·75° C. The specific gravity is 0·895–900 and the boiling-point 175° C. There is also a "heavy camphor oil," which is a green liquid, sp. gr. 0·960–0·970, and boils about 240–270° C.

Cassia Oil.—In view of the probability that considerable adulteration of this article takes place, it is pointed out that the specific gravity is a good indication, because there is no practicable adulterant that is not specifically considerably lighter than cassia oil. Good pure cassia oil should have a sp. gr. of at least 1·063 at 15° C. A lighter oil should be unhesitatingly looked upon as doubtful. Some oil that was found to have a sp. gr. of only 1·029 proved, on further examination, to contain about 30 per cent. of cedar-wood oil, sp. gr. 0·945.

Cedar-wood Oil.—The American imports of this article are said to be of inferior quality, since they consist of only the more volatile portions of the normal cedar-wood oil, being obtained not by ordinary distillation, but by condensation of the vapour given off during the drying of the "red cedar" wood. (*Juniperus Virginianus*).

Chamomile Oil.—The supply of "Roman chamomiles" for the distillation of this oil is said to be falling off, and likely to cease altogether in a few years. The German field chamomile is now used largely for the purpose.

Citronella Oil.—Consul Freudenberg, the German consul in Colombo, this oil is produced in Ceylon almost exclusively in the southern provinces of the island, partly by the richer natives, holding the larger plantations, and partly by the poorer ones, who plant their small plots of land with citronella grass. The former carry on the distillation in regular apparatus by means of steam; the poorer manufacturers boil their grass in small boilers, and construct with earthen vessels a primitive distillatory apparatus. The oil is distilled throughout nearly the whole year, though December and January, March and April, and July and August are the most favourable periods; and good plantations give three crops that correspond nearly with these periods. At present prices the poorer natives can only hold their own by performing all the labour themselves; but the richer ones manufacture on more rational principles, and, therefore, more cheaply. A well-managed plantation will yield per acre 24 flasks (about 45 kilos) three times a year, an inferior one only 18 flasks twice a year. One of the chief difficulties in the industry is the want of fuel. Some years since citronella oil was much adulterated with petroleum, but this was easily detected by observing the specific gravity, so that natives have now given up the practice. Notwithstanding this statement, Messrs. Schimmel say that they have met with a sample containing a considerable quantity of a product of the petroleum distillation having a sp. gr. of 0·830 and boiling at 250° to 300° C. The export of citronella oil from Ceylon during the year 1885 is estimated at 6,461,278 ounces, or upwards of 400,000 pounds, 3,623,701 ounces of which came to this country.

Coriander Oil is said to find an increasing use, not only in the manufacture of liqueurs, but also in perfumery.

Elemi Oil.—This oil, distilled from Manila resin, is spoken of as likely to become an important article in perfumery.

Geranium Oil.—Speaking of the production of this oil in India it is remarked that the "geranium" or "rusa-grass" (*Andropogon Schoenanthus*) undoubtedly yields both the fine "geranium" or "palmarosa" oil, as well as the ordinary "ginger grass" oil; but in what relation the two oils stand to each other has not yet been ascertained. An adulteration with turpentine has been suggested, but it is thought quite as probable that certain fractions of inferior odour may be separated in the distillation, and constitute the ginger grass oil of commerce.

Hop Oil.—It is stated that in respect to hop aroma 600 grams of the fine distilled oil will correspond to about 100 kilos of prime unsulphured Bavarian hops.

Iris Oil.—In the preparation of this delicate oil it is found necessary to keep the temperature as low as possible, never exceeding 100° C. Its distillation more or less *in vacuo* can be accomplished in laboratory experiments, but in working on the large scale there remain many difficulties yet to be overcome. The yield is only one part of oil from one thousand parts of the root.

Lignaloe Oil.—The principal demand for this oil is said to be for the manufacture of a favourite perfume known as "Maiglöckchen-Composition" (lily-of-the-valley), of which it is said to form the basis. The oil should not be used when freshly prepared, since it improves in aroma by being kept a year or more.

Mirbane Oil.—"Oil of Mirbane" is said to be increasingly used as a soap perfume, and also to cover the disagreeable odour of common soaps, for which purpose it is superior to any essential oils.

Myrtle Oil and Myrtol.—Myrtol, which has been recently strongly recommended in the treatment of bronchial and pulmonary catarrh and certain affections of the bladder, consists of the portion of myrtle oil that boils between 160° and 170° C.

Opopanax Oil.—The distillate from opopanax resin is said to be coming much in favour with perfumers.

Patchouli Oil.—The patchouli herb imported from Calcutta and Bombay contains usually 75 per cent. of stalks, and does not yield nearly so fine a distillate as that shipped from the Malay peninsula. The Java patchouli is still better in appearance, but is inferior in fragrance.

Peppermint Oil, Japanese.—An obstacle to the use of the Japanese peppermint oil for food purposes is its peculiar bitter taste. Messrs. Schimmel have reason to believe that the constituent of the oil to which this is due is menthon ($C_{10}H_{18}O$), and are experimenting with a view to its removal.

Rosewood Oil.—Under this name a mixture of essential oils is now met with, the genuine oil distilled from the root-wood of *Convolvulus scoparius* having disappeared from commerce. A small quantity of the wood has recently been received from the Canary islands, and some oil distilled from it is described as of a beautiful golden-yellow colour, having an extremely agreeable rose-like odour, and solidifying, like rose oil, at about +12° C. to form acicular crystals.

Sandal Wood Oil, East Indian.—The question is raised whether the regulation of the East Indian Government that forbids the felling of sandal wood trees before maturity, which is reached in eighteen to twenty-five years, is not too stringently carried out. The felling takes place at the end of the year; the stem is freed from bark, cut into logs and sorted. The finest oil is yielded by dark mature heart-wood; such oil, kept for some years, matures and develops a very fine odour. A lower priced, but far inferior oil, is yielded by the sandal wood grown in the Dutch East Indies, for which Macassar is the principal market.

(*To be continued.*)

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VARYING CHARACTERS OF SOME IMPORTANT MEDICINAL AGENTS.

SOME weeks ago, in mentioning the address delivered by Dr. WHITLA on the present position and prospects of therapeutics, reference was made to his opinion of the assistance that has been rendered to the physician, not only by chemical investigation, but also by pharmacy, in making provision for the use of drugs with greater precision. The preparation of the basic constituents which are the active principles of various medicinal plants was instanced as one of the chief contributions of importance in this direction, and there is no doubt that in some instances the treatment of disease has been greatly facilitated by placing at the disposal of medical men such definite substances as quinine, strychnine, morphine, etc. But among the number of substances belonging to this class there are many which give rise to such different results when employed in medical treatment or in physiological investigation, that it appears evident our knowledge of them is still imperfect. To some extent such different effects may be ascribed to the kind of animals upon which experiments are made, or when the same kind of animal is experimented upon, to the age, sex, or individuality, and especial susceptibility to the influence of the substance administered. In some cases, also, the mode of preparation or the degree of purity of such substances may partly account for the different effects produced. Such differences of effect or inequality in the action of medicinal agents are, however, found to obtain as matter of experience, and in the absence of more precise knowledge of the various causes by which they are brought about it is customary to ascribe them either to an assumed impurity of the particular agent used, or to the idiosyncrasy of the patients. In some instances the directions given in the various Pharmacopœias for the preparation of certain medicinal agents, and for the regulation of their strength, differ in a more or less marked manner from each other, and sufficiently to make the products themselves very different. Even those substances for the preparation of which no directions are given, and there is no statement as to the amount of active principle, but which are defined in the various pharmacopœias solely by a description of their characters, do not unfrequently present very considerable discrepancies in their chemical composition or nature and in their pharmacological value. Thus, for instance, the opinion formerly entertained that the alkaloids met with in commerce constitute in a pure state the active principles of plants, has in several cases been found to be incorrect. Extended investigation has shown that in most of the plants possessing poisonous and medicinal properties, more than one alkaloid or glucoside occur, and that these substances, often differing very much in their physiological action, are not completely separated from each other by the methods of preparation in general use. In other instances it has been found that such active principles of plants are liable to undergo alteration by the processes adopted for their extraction, so that they are either rendered inactive or so changed that their physiological action is entirely different from that of the substances contained in the plants.

In this way it happens that, according to the more or less careful preparation of the alkaloids glucosides, etc., these substances, as met with in commerce, may often consist of varying mixtures of the supposed pure substance with others naturally associated with it in the plant or resulting from alteration. Thus, for instance, the pilocarpine of commerce contains, besides true pilocarpine, jaborine, which has a different physiological action. Eserine or physostigmine not infrequently contains also calabarine; quinine salts also contain cinchonidine, which, according to some authorities, has a tetanizing action. As still more marked illustrations of this fact may be mentioned aconitine, atropine, daturine, narceine, veratrine, digitalin, paracotoin, podophyllin, and many other substances of a like nature, which as generally met with in commerce are often varying mixtures of very different pharmacological value. Such differences in the composition of medicinal agents known by the same names are of importance, since their use might be attended with danger, and hence great attention has lately been paid to the importance of ensuring uniformity in the medicinal agents known by particular names. The attempts that have been made to prepare and introduce an international pharmacopœia may be referred to as indicating the interest that has been taken in this subject, though unfortunately they have not as yet been successful.

Some years ago attention was particularly directed to this subject by Dr. C. J. SNIJDERS, in a paper published by him in a Dutch medical journal, and the Medical Society of Holland, deeming the matter worthy of consideration, commissioned Dr. PLUGGE to prepare a report on the state of knowledge existing in regard to it. The report was intended to present a general summary of what is known in regard to medicinal agents that are employed under the same names, but at the same time differ in composition

and in pharmacological action. This report has now been completed, and published in the form of one hundred and fourteen pages of text, with copious tables giving a comparative survey of the differences between preparations described in various pharmacopœias under the same names. The main object in view was to show in a condensed form what medicinal preparations differ in composition, and, presumably therefore in their effects, pointing out the circumstances which determine these differences, and the influence they would exercise upon their action. In the case of the alkaloids and glucosides it was considered desirable to enter into a more detailed consideration of the conditions under which they occur naturally asssociated with other substances, the influences exercised by the selection of particular parts of a plant for their preparation, by the age of the plant as well as the climate and soil in modifying the amount and relative proportion of the substances associated together in the plant; lastly, also the important influences exercised by the process adopted for the extraction of these substances, and by the mode of preserving them, upon their external characters.

As a compilation of what is known respecting the more potent alkaloids, the report contains a large amount of information, and is also useful as a means of reference to original memoirs. The section on digitalis may be taken as a good illustration of the character of the work. After mentioning the time of collection and the difference between wild and cultivated plants, etc, the characteristic components are described as follow:—First comes the *digitalin* obtained by HOMOLLE in 1845, a very poisonous non-nitrogenous substance. Further investigation proved that it was not a simple substance, but a mixture of several, which have not always been designated by the same names. The product to which HOMOLLE and QUEVENNE gave the name of "French *digitalin*" consisted, according to them, of three substances—*digitalin*, insoluble in ether-alcohol; *digitaline* and *digitalose*, both soluble in ether-alcohol. German *digitalin*, which was at first named *digitalosin* by WALZ, and afterwards *digitalin*, was also a mixture containing, according to him: 1, *digitalin*, convertible by acids into *paradigitaletin*, *digitaliresin* and glucose; 2, *digitaletin*; 3, *digitaloin* (or *digitaloic acid*); 4, *α* and *β-digitalacrin*; and 5, *digitalis fat*. NATIVELLE prepared from digitalis leaves a very active product containing three substances, *digitalein*, *digitalin* and *digitin*. WIGGERS gave different names to these substances as follows:—*digitalein* he named *digitalin*, or digitalinum activum; *digitalin* he termed *digitalein*, or digitalinum incrystallis, also a potent substance, but amorphous; *digitin* he named digitalinum passivum. The confusion thus caused made a fresh examination of the leaves desirable, and that was undertaken by SCHMIEDEBERG in 1875, who established the existence of several substances, to which he gave the names that are still generally retained: 1, *digitonin*, resembling saponin, and destitute of the characteristic effect of digitalis; 2, *digitalin*, a crystallizable glucoside very sparingly soluble in water; 3, *digitalein*, differing from the last substance chiefly in its solubility in water and amorphous condition; 4, *digitoxin*, a crystallizable substance almost insoluble in water, but the most potent constituent of digitalis leaves. All three of the last named substances have the action of digitalis, though in various degrees of intensity. The decomposition products of these four substances formed by the action of acids are partly active and partly inactive. These substances probably occur in varying proportions in digitalis leaves, and by reason of their unequal solubility in water, such preparations as the infusion, extract, tincture, etc., are likely to be of unequal strength. Hence the danger attending the use of digitalis preparations, and therefore the desirability of obtaining a definite active principle of uniform character for the use of this drug in such a manner that it can be relied upon. The substance met with in commerce under the name of digitalin does not, according to Dr. PLUGGE'S opinion, answer to this, but is like commercial aconitine, a varying mixture sometimes amorphous, sometimes crystalline, sometimes soluble in water, and sometimes insoluble. For these reasons Dr. PLUGGE thinks it so difficult to decide which can be relied upon, that the use of these substances and even of digitalis itself should be entirely dropped, and that until a trustworthy form of preparation can be devised, a substitute should be sought for among the numerous drugs which resemble digitalis in their effects.

The report to be presented by the Council of the Pharmaceutical Society of Australasia to the members at the annual meeting, which was to take place on the 9th ult., appears to be a satisfactory one in respect to membership as well as finance. It is suggestive that there has not been one call made on the Benevolent Fund during the year. As an instance of the growing importance of pharmaceutical institutions in Victoria, it is stated that the Council of the Melbourne University has made it compulsory that all its medical students shall attend the course of instruction in Practical Pharmacy at the Society's College. Mention is also made of the recent visit of Messrs. Bosisto and Bowen—past and present Presidents—to this country, and gratification expressed as to the courtesies they received.

* * *

The *National Druggist* estimates that there are at present about nine hundred senior students in the colleges and schools of pharmacy in the United States, and that at least six hundred of them will succeed in obtaining the title of "graduate in pharmacy" at the approaching close of the session. The number is large, but is not considered to be in excess of the demand, and our contemporary pertinently remarks that even if it were, the educational colleges are not to be held responsible for the increasing

number of people who believe they can earn a competency in the practice of pharmacy.

* * *

We learn from the *American Druggist* than an effort is being made in Brooklyn to secure legislation that would prohibit the dispensing of cocaine and its salts, excepting upon the authority of a physician's prescription. As no restriction is laid upon the dispensing of any other medicine, and practically little or no restraint is exercised over the sale of poisonous drugs in the city, it is somewhat surprising that cocaine should be the first medicinal substance selected to become the subject of exceptional legislation.

* * *

According to a recent consular report from Java, enclosing some statistics supplied by the local Planters' Association, the private plantations of cinchona in that island cover 21,000 acres, and contain 30,000,000 trees, of which 14,000,000 are *C. succirubra* trees. The crop for 1887 is estimated at 1,433,250 pounds of bark, capable of yielding on the average 3 per cent. of quinine. In addition there are in the Dutch Government plantations 3,436,700 trees, of which 2,004,700 are "Ledgeriana" plants.

* * *

The French have not yet been very fortunate in their attempts to introduce the cultivation of cinchona in any of their colonies. The attempt made in Algeria appears to have been abandoned; but, according to the *Archives de Pharmacie*, some experiments commenced two years since in the Ile de la Réunion are likely to be crowned with success. Our contemporary is "awaiting with impatience the moment when the French will be able to provide themselves with cinchona bark without being tributaries to foreign countries."

* * *

In a paper on the official organic drugs of five countries, by Professor Oscar Oldberg, it is estimated that the United States, British, German, French and Swedish Pharmacopœias include between them 593 drugs of organic origin. Out of the entire number only 99 are included in all five of the pharmacopœias, 56 in four, and 43 in two, while 300 are only mentioned in one of them. Of these 300 organic drugs included in only one pharmacopœia, 52 are official in the United States, 13 in Great Britain, 9 in Germany, 9 in Sweden, and no less than 217 in France.

* * *

The post of second botanical assistant in the British Museum, vacated by the appointment of Mr. Fawcett to the Directorship of the Jamaica Public Gardens, in succession to Mr. D. Morris, now Assistant-Director at Kew, has been filled by the appointment of Mr. E. G. Baker, who last year carried off the Pereira Medal, the Peter Squire Prize, and other honours in connection with the School of Pharmacy, Bloomsbury Square.

* * *

At the next meeting of the Chemical Society, to be held on the 21st instant, papers will be read on "The Atomic Weight of Gold," by Professor T. E. Thorpe and A. P. Laurie; "The Atomic Weight of Silicon," by Professor Thorpe and J. W. Young; "Substitution in the Benzene Series," by Dr. H. F. Morley, and "A Contribution to the Study of Well Waters," by R. Warington.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN EDINBURGH.

The third Evening Meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday evening, April 13, at 8.30. Mr. H. Bellyse Baildon, B.A., F.R.S.E., Chairman of the Executive of the North British Branch, in the chair.

The minutes of last meeting having been read and approved, a paper was read:—

Amorphous Cocaine.

BY RALPH STOCKMAN, M.D.

Dr. Stockman illustrated his paper by a very successful practical demonstration and a number of specimens.

The paper is printed at p. 861, and gave rise to the following discussion:—

The Chairman said he was sure they had all listened with pleasure to Dr. Stockman, to whom they were much indebted for this able and interesting communication on a subject of much pharmaceutical interest.

Dr. Clark said the paper had produced an effect the opposite of that attributed to the substance dealt with, because in place of arresting his intellectual appetite he had an insatiable desire to hear more. The paper contained much that would be very useful to those who were working at this subject.

Mr. Dott said the word "amorphous" as applied to alkaloids was frequently used in a somewhat loose and ambiguous way. It ought to be applied only to an allotropic modification of a crystalline body, and not, as was often done, to an isomeric body which might be essentially different. Dr. Stockman stated that he had exhausted all the methods usually employed in the separation of alkaloids. He should like to ask if he had tried fractional precipitation, which sometimes succeeded when other methods failed. With regard to the solubility of freshly precipitated cocaine in excess of ammonia, and its subsequent separation in the form of fine needles, he thought that was to be explained by the fact that the alkaloid was precipitated in the amorphous condition and was soluble, but that on standing it gradually assumed the crystalline condition, in which it was comparatively insoluble and therefore separated. He had much pleasure in proposing a cordial vote of thanks to Dr. Stockman.

The motion was seconded by the Chairman and passed with acclamation.

Three papers were then read and the discussion thereon taken conjointly. They were entitled:—

Solubility of Gelatine as compared with other Pill Coatings.

BY THOMAS THOMPSON.

Note on Blaud's Pill Mass.

BY THOMAS THOMPSON.

Notes on Blaud's Pills.

BY PETER BOA.

The papers are printed at pp. 863, 864, 865, and gave rise to the following discussion.

Mr. J. B. Stephenson said he could not see how there could be any difference between the granular and the ordinary ferrous sulphate, and he had found no difficulty in making Blaud's pills with the latter. It was a decided advantage to have both salts rubbed to a fine powder and sifted. By this means and adding sugar and tragacanth and beating thoroughly a good plastic mass was obtained, and pills made from it would be found as green as grass after the lapse of several weeks. He moved a cordial vote of thanks to the two authors of the papers.

Dr. Clark said at the present time there were three distinct varieties of Blaud's pills to be met with in commerce. The first contained the iron in an oxidized con-

dition. Anyone who had examined the American Blaud's pills would know that they did not present the appearance looked for in such pills; they were certainly not as green as grass. There was also a pill in which the old formula with honey was used, the mass being evaporated in a steam pan. In this case ferrous carbonate was produced and retained in that condition. In the third case the reaction was as far as possible prevented before the pill was made. The last, he thought, was the proper form. In this case the nascent ferrous carbonate was produced in the stomach. To attain this condition it was necessary to have the salts as dry as possible, add a fair proportion of sugar and avoid an excess of water. Those who had had experience in making these pills would know that if the syrup was added to the whole quantity of ingredients at once it required the addition of a very large quantity to make a satisfactory mass. The reason of that seemed to be that the small amount of syrup was lost in the large body of ingredients. The way to obtain a mass with the smallest proportion of liquid was to add the excipient to a small quantity of the ingredients and then add the remainder of the ingredients by little and little. In this way chemical reaction took place in the first quantity, and the water of crystallization thus liberated served to mass the next quantity added. In such a mass the particles of ferrous sulphate and potassium carbonate might be detected by the microscope unchanged, and pills so made might be kept in good condition for any length of time. He was at a loss to understand how the ferruginous capsules referred to by Mr. Thompson would act, as he was afraid the particles of the salts would become coated with oil which would prevent chemical action taking place even in the stomach. Referring to the gelatine coating of Blaud's pills he gave as his experience that it was impossible to get a permanent coating of the pills if they contained undecomposed ferrous sulphate. In such a case, no matter how well dried the pills might be, in a few days they lost their gloss and became soft, clearly indicating the liberation of water. He had examined samples of the gelatine-coated Blaud's pills in the market and invariably found that the contents were of a red-brown colour throughout, showing that the makers had not scrupled to abandon the ferrous condition in order to obtain a permanent pill. He thought they owed a debt of gratitude to the two gentlemen who had brought forward these very practical papers.

Mr. Thompson said he had found that the oil did not prevent the reaction between the ferrous sulphate and potassium carbonate when the capsule was placed in water.

Mr. Gilmour remarked that in the capsules shown it was evident that decomposition had already set in. Mr. Thompson's experiments proved that of the pill coatings in general use gelatine was the most soluble. There were four conditions demanded of a pill coating. It must be readily soluble, cover the taste of the pill, preserve it and give it an elegant appearance. The first three were fulfilled by gelatine, but he was afraid it did not meet the last one, and that he thought was the one principally required by the public. This was why pearl coating was so popular, and Mr. Thompson confirmed his own results as to the insolubility of the latter. With regard to Blaud's pills he thought the discussion showed that Mr. Martindale's formula is the one now generally accepted. He believed Mr. Boa was correct in saying the best pills were got when granulated ferrous sulphate was used. Last summer he made a quantity by the old process, using ordinary crystallized ferrous sulphate, and he found that the pills showed signs of oxidation reaching to the very centre after standing for three hours.

Mr. Gorrie said it was generally stated that sugar acted as a preservative in Blaud's pills, but this was true only to a limited extent. Since the publication of Mr. Duncan's paper, he had tried Ince's formula, using glycerine instead of sugar and the result left nothing to be desired.

Mr. Forret said he had tried the dried ferrous sulphate, following Mr. Martindale's formula but using golden syrup as an excipient. Ten days after being made the pills were estimated and showed no signs of oxidation, and he thought they might be kept practically any length of time.

The Chairman said he agreed with Dr. Clark that whatever the intention of the originator of the pills may have been, the proper place for the formation of ferrous carbonate was in the stomach. He seconded the vote of thanks proposed by Mr. Stephenson, and it was passed with acclamation.

At the request of the Chairman, Mr. Thompson then exhibited in operation and explained his patent gelatine pill-coating and capsule-making machine. There were two machines in operation, one coating pills and the other making capsules. A large batch of compound rhubarb pills was coated; the whole operation occupying about half an hour.

The process was watched with much interest, and, on the motion of the Chairman, a vote of thanks was awarded to Mr. Thompson with loud applause.

Attention was directed to the following additions to the Museum:—

Pure Lecithin.
From Messrs. H. C. Baildon and Son, Edinburgh.
Cryptopia.
From Messrs. T. and H. Smith and Co., Edinburgh.
Cinchona Stems.
From the Curator of the Society's Museum, London.

The Chairman stated that in ordinary course this would have been the last meeting of the session, but they had been a little late in beginning, and it was probable that they might be able to arrange for another meeting, which would be duly intimated.

The meeting then closed.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The tenth general meeting of the thirty-eighth session was held at the Royal Institution, on Thursday evening, March 31. The President, Mr. A. C. Abraham, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed, and several donations to the library and museum were announced.

A vote of thanks was accorded to the respective donors, and there being no miscellaneous communications, the President called upon Mr. A. H. Samuel, F.C.S., to read a paper on Russian Petroleum, from which the following extracts are taken:—

Russian Petroleum.

BY A. H. SAMUEL, F.C.S.

The great centre of the petroleum-bearing territory of Russia is at Baku, on the Apsheron peninsula, jutting out into the Caspian Sea, and notwithstanding the vastness of the production, the present workings are circumscribed within the very limited area of about three and a half square miles.

Chemically, Russian and American crude petroleum present a marked difference, the American being a mixture of the first series of hydrocarbons or paraffins, as represented by the formula $C_nH_{22}+_2$, as methane, ethane, etc., whilst the Russian crude is composed of the second and third series of hydrocarbons or olefines represented by the formulæ C_nH_{2n} and $C_nH_{2n}-_2$, as methene propene, methine propine, etc. Practically, the whole of the refining, at present, of Russian petroleum is carried on at Baku, the situation of which renders it a distributing centre of the first importance, as it has the best harbour on the Caspian Sea.

Experts in the geological nature of the surrounding country estimate that petroleum deposits underlie no less than 14,000 square miles, and Mr. Redwood, who has paid several visits to the Caucasus, states that at least 1000 to 1200 square miles of the Apsheron peninsula may be regarded as oil-producing territory.

The two chief districts in which the wells are located are at Surak Lani and Balak Lani, the former about twelve miles, and the latter from six to eight miles distant from Baku. At Surak Lani there are still the ruins of the ancient temples of the Persian Magi, in some of which, to this day, the gases generated from the oil wells are continually in flame. Zoroaster was supposed to be founder of fire-worship, the origin of which is said to be due to these natural fires from petroleum gases. As the Persians found that as fast as they extinguished the fires in one place, they started spontaneously in flame in another, they concluded that the fires had a supernatural origin. From this the existence of petroleum in Russia would seem to have been known for at least 2500 years. It seems therefore remarkable that it should have been left to the United States of America, in which the earliest records of petroleum discovery do not date further back than the beginning of the latter half of the present century, to be the first in the field to supply the greater portion of the world with petroleum for practical purposes.

The petroleum territory of the Caucasus seems to have been left almost entirely undisturbed for all practical purposes till after the annexation of Baku by Russia in 1801, and one of the first acts of the Russian Government was to make the extraction of petroleum a State monopoly, and the sole right of working it was farmed out to a merchant named Merzoeff.

From the year 1801 till about 1830, this Merzoeff extracted from 2000 to 3000 tons of oil per annum, and from 1830 to 1858, about 3500 tons per annum, all of which he obtained from pit-wells, sunk a few feet from the surface of the ground, and in the most primitive manner possible.

The vast petroleum wealth under his feet slept on comparatively undisturbed until 1872, by which time the American petroleum industry had already made rapid strides, and the world, including Russia, was being almost entirely supplied with American burning oil and other petroleum products.

This state of things, thoroughly aroused the Russian Government, and resulted in its abolishing the monopoly, so long held by Merzoeff, and throwing open the industry to the world.

The Russian Government, however, in lieu of the royalties it had been receiving from Merzoeff, put on an excise duty, which was continued for five years more till 1877, when the increasing American competition caused it to abolish the remaining tax also, and the trade has since remained free and unfettered.

The crude oil in the early days was brought from the wells to the refineries in Baku in Persian carts in roughly made barrels, and it is stated that as much as £100,000 per annum was earned by the carters engaged in this traffic.

Two years prior to the abolition of the excise duty, namely in 1875, the development of the Russian oil industry reached its most important crisis, by the appearance on the scene of the Nobel Brothers, whose fame in connection with Russian petroleum is now world wide.

These Nobels are a most remarkable family. Their father (a Swede), Emmanuel Nobel, was the inventor of the torpedo, the secret of which he took from Sweden to St. Petersburg in 1838, and sold to the Russian Government. One of his sons, Alfred Nobel, became a distinguished chemist, and claims to be the inventor of that terrible explosive dynamite. Their father with his other two sons, Ludwig and Robert, established an immense engineering works on the banks of the Neva, and their firm took a prominent part in the fortifications of Cronstadt, prior to the Crimean war. At the death of the father, Ludwig became the head of the works, and accepted from the Russian Government a series of contracts for converting guns and manufacturing rifle-stocks.

For the latter walnut wood was required, and it was in search of that wood that Robert Nobel was sent to the Caucasus, causing him to visit the petroleum regions of Baku.

Being a throughly practical and scientific engineer, he was so enamoured at what he had seen of the capacities of petroleum production and refining that on his return to St. Petersburg he urged his brother to co-operate in developing the industry, and very shortly after Robert Nobel established himself at Baku and commenced operations in quite a small way as a petroleum refiner.

Calling the resources of engineering, chemistry and commercial organization to his aid, Nobel in the first place replaced the cumbrous system of carting the oil from the wells to the refineries at Baku by laying down pipe-lines, though he was compelled to erect a line of watch houses manned with armed men to guard his pipes against destruction.

Nobel completely revolutionized the whole previous system of extraction, refining and distribution. He introduced the most improved systems of drilling and refining, for which he took advantage in every way possible of the American system. One of his earliest steps was to gain the consent of the Russian Government, and immediately he organized a complete system of supplying the whole of Russia with burning oil.

To effect this, he had built a fleet of tank-steamers for navigating the Caspian sea and the river Volga, using as fuel for same the astatke or petroleum residuum, in place of coal. These steamers were built partly at his brother's works on the Neva and partly in Sweden, and were conveyed in parts—by the canal system—to the Volga and there put together and delivered at Baku. In this way he conveyed his refined oil from Baku to Trakitzin on the Volga, which he constituted his headquarters for forwarding the oil by various railway systems. The oil is pumped from the steamers into railway tank-waggons, and at various points throughout Russia Nobel has established stations where he stores immense quantities in reservoirs, and dealers and consumers have to bring their own barrels or other receptacles for all the oil they want. It is an entire cash-before-delivery business, and the Russian railway companies collect the money for a small commission. By this perfect organization and aid of the protective duties, the Nobels succeeded in completely superseding the sale of American petroleum by the Russian article.

In order to institute a comparison of the vastness of the Russian production with the American, I may state that the most prolific well ever known in the United States, which was struck in the autumn of 1884, yielded for a time at the rate of 260,000 gallons, or about a quarter of a million gallons, in twenty-four hours.

At Balohhani, in 1883, a well was struck, now known as the celebrated Droobja well, which belched forth a column of oil 300 feet in height, and for over one hundred days was perfectly uncontrollable; it has been estimated that for that period its yield per twenty-four hours was not less than 2,800,000 gallons, so that the yield from this one well was equivalent to more than the present production per day of the whole 23,000 wells in the United States of America, which latter is estimated at about 2,700,000 gallons per day.

This well sent forth along with the crude oil vast volumes of gas and sand, the latter of which overwhelmed the derricks and other works of the surrounding well-owners, and in addition to the loss sustained by the millions of gallons of oil that went entirely to waste from want of means of storage, the owners of the well, instead of making their fortune, were ruined by the large sums they had to pay for compensation for the damage their well had occasioned.

The next large-flowing well belonged to Nobel, struck

in 1885. It is properly capped, but will yield at any time it is opened at the rate of over 2,000,000 gallons per day; and another of their wells over 1,125,000 gallons per day whenever opened.

There are about sixty of these flowing-wells which are usually capped with slide valves, but often the rush of oil is so tremendous, with a pressure estimated at something like 200 to 300 lbs. to the square inch, as to be practically impossible to cap the well until it has become considerably exhausted, vast quantities of crude oil being allowed to run to waste.

There were in 1885, about two hundred actually productive wells, of which forty were kept idle, for want of demand for crude oil.

The remainder yielded in 1885, according to Mr. Peacock, Vice-Consul at Batonm, 575,000,000 gallons of crude oil, the yearly production of the average well being about 3,500,000 against the yearly production of the average well in America being 43,500 gallons.

From statistics furnished by Mr. Peacock it appears that at Baku, at present, there are about two hundred and sixty refineries, producing yearly about 140,000,000 gallons of refined burning oil.

Many of these refiners, however, have had completely to shut down, owing to the lowness in prices, supply being greatly in excess of demand, and many others have partially suspended working.

The world's present consumption of burning oil is estimated at about 2,500,000 gallons per day, of which, hitherto, the United States of America have supplied the greater portion.

America in the future must be prepared for fierce competition from her Russian rival, more particularly in those countries bordering on the Russian Empire, as well as in Central and Southern Europe, Northern and Southern Asia, etc.

The Russian crude oil is obtained by boring, much in the same way as the American, and is refined also by the methods described in my paper last session.

The sulphuric acid is made on the spot from sulphur found near Baku, and the caustic soda imported from this country.

The specific gravity of Russian crude is usually about ·870 to ·875, sometimes as heavy as ·885 and as light as ·850. The specific gravity of American crude is now about ·800 to ·820, so that the Russian oil is naturally a heavier oil than American.

There is no demand at present for the small proportion of lighter products, that distil over prior to the kerosene, viz, the benzene, specific gravity ·754, and gasolene, ·787, which latter in America are of considerable commercial value.

The specific gravity of the most carefully refined Russian burning oil is about ·823 against American ·803, or roughly, whilst American is 8 lbs. to the gallon Russian is $8\frac{1}{4}$ lbs. to the gallon.

Russian crude yields only from 22 to 27 per cent. of burning oil, and only about 22 per cent. of the finest quality. American crude on the other hand yields upwards of 70 per cent. of burning oil, or over three times as much as Russian. Russian crude yields a much greater quantity of the heavier or lubricating oil than American.

Russian crude is almost practically free from solid hydrocarbons, such as paraffin wax, which latter is an important product of American crude. On this account Russian lubricating oils have the advantage over American in being capable of bearing exposure to very low temperatures without solidifying, and thereby clogging machinery where exposure is necessary, and also have a higher viscosity in relation to specific gravity than American. Ordinary Russian burning oil has a slightly stronger odour than American, but is freer from colour than the latter.

Russian oil, as now imported into this country, may be said to be a good burning oil when used in the ordinary petroleum lamps and wicks of the shops, although owing to its higher specific gravity it might not be thought so; but it makes up for lighter gravity by being more homogeneous than American, its most volatile hydrocarbons not differing very much in boiling point from its least volatile ones.

As a rule, when the American and Russian oils are compared in two lamps the fonts of which are quite full, the American gives a slightly stronger light than the Russian; but as the consumption of oil proceeds, the illuminating power inclines in favour of the Russian, the latter seeming to have a greater power of ascending the wick than the American.

So far Russian petroleum burning oil has made but little headway in this country. The fact is that the first shipments that made their way here of Russian kerosene were so badly refined as to create at the outset a strong prejudice against it. It was only brought over in inferior barrels, the glue with which they were lined becoming decomposed and further deteriorating the quality of the oil. All this has now been overcome, and recent importations in bulk, in tank steamers, have left but little to be desired as regards quality.

The price of American "Royal Daylight" petroleum is, however, so low, and there is such a small difference between its value in England and that of Russian, viz., about a penny per gallon dearer than Russian, that there is not sufficient inducement for the dealers to push it in lieu of American.

To Russia we owe the new system of successfully carrying oil in bulk across the seas, thereby saving freight and conducing to greater celerity of loading and despatch, and also avoiding deterioration from contact in inferior glued barrels. The experiment of landing a cargo of Russian oil in bulk in Liverpool has recently been tried with success by the s.s. *Petriana*, which success would have been greater had there been tank storage accommodation in that port to receive it, instead of delivering it, as had to be done, directly into barrels.

The Americans some years ago tried the bulk system of transport across the ocean, but failed in it, but following the example of Russia, they have renewed their efforts and have recently sent several cargoes of oil across the Atlantic in bulk, which have all safely arrived.

In order to further develop the Russian petroleum industry, what is mainly wanted now is increased transit facilities from Baku. The present transit for Western Europe is by the Trans-Caucasian Railway from Baku to Batoum on the Black Sea, and a portion of this rail-line has to cross what is called the Suram Pass, the gradients over which are so steep that only a very limited number of waggons can be conveyed over it at one time, and the carriage in consequence is very expensive.

In order to cheapen the route from Baku to Batoum, it is now proposed to lay a pipe-line the whole distance of about 500 miles, on the principle of the American pipe-lines, having pumping stations at stated distances along the route. It will take about three years to complete, but when finished, must vastly increase the export of Russian petroleum products, and may ultimately lead to Batoum itself, on the Black Sea, becoming a great refining centre.

At present the price of Russian crude oil at the wells is as low as $11\frac{1}{2}d.$ per ton, or about one twenty-second of a penny per gallon, against American at the wells about $\frac{3}{4}d.$ per gallon, and it is this excessively low price of Russian crude that causes the present disastrous depression amongst its producers and refiners.

The paper was illustrated with some excellent views by oxy-hydrogen lantern. At the close a short discussion took place, and a vote of thanks, proposed by Mr. E. Davies and seconded by the President, was heartily accorded to Mr. Samuel for his highly interesting paper.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

A special general meeting of the trade was held under the auspices of the above Society on Friday, the 15th inst.

The meeting was convened to discuss the "Pharmacy Acts Amendment Bill" now before Parliament.

A resolution in support of the Bill as read was proposed by Mr. Preston, seconded by Mr. Ward, F.C.S., and carried with one dissentient only, the latter expressing his entire approval of the Bill so far as it went.

The chair was occupied by the President, Mr. Newsholme.

The monthly general meeting was held in the Society's lecture room, Norfolk Row, on Wednesday evening, the 20th inst. The chair was occupied by Mr. J. M. Furness, Vice-President. A paper was read by Mr. Frederick Spurr on "Micro-organisms and Disinfectants."

The paper, which was an exceedingly thoughtful digest of the subject, was of a facetious character, and Mr. Spurr, who secured the careful attention of his audience throughout, was at the close loudly applauded.

A vote of thanks for the paper was passed.

New members were elected.

TORQUAY CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at Wood's Temperance Hotel on Tuesday, the 5th inst., Mr. T. Ness occupied the chair.

At the inaugural meeting in December prizes were offered by several patrons for the best papers on specified pharmaceutical topics, amongst them one by Mr. Riches for the best essay on the question, "Whether it is desirable, in the present depressed state of the drug trade, to establish a compulsory system of study?" Four competitors entered, the prize being awarded by the judge, Mr. Barnard S. Proctor, to Mr. Austin Hoare. His paper, together with the other three, was read on the 5th inst., and a discussion thereon invited.

Mr. Hoare's paper was written in favour of a curriculum, but the general drift of the papers and speeches was that the cost of increased education could be ill borne by the already impoverished pharmacist. The system of "cutting" by stores was strongly condemned, and several urged that if a curriculum were enforced its necessary accompaniment would be increased legislative protection. The habitual ordering by some physicians of secret and patent medicines was strongly commented upon.

Messrs. Curtis, Smith, F. Riches, Hoare, E. H. Farr, Colebank, J. March and the Chairman took part in the discussion.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At a meeting of the Society on Thursday, April 7, Mr. William Crookes, F.R.S. (President), in the chair, the following papers were read:—

Researches on the Constitution of Azo- and Diazo-derivatives. II. Diazoamido-compounds (continued). By R. Meldola, F.R.S., and F. W. Streatfeild.

Conjugated Sulphates and Isomorphous Mixtures of the Copper-magnesium-group. By P. C. Roy, B.Sc.

Suboxide of Silver, Ag_4O. By G. H. Bailey and G. J. Fowler.—The authors have repeated the experiments of Wöhler, and find no evidence of the formation of an argentous citrate when argentic citrate is heated to 100° in a current of hydrogen. The change is a progressive one, the citrate undergoing reduction with the formation of CO_2 and H_2O. In an experiment in which argentic citrate had been exposed to hydrogen at 100° for thirty-six hours the residue after extraction with ether contained 85·8 per cent. of silver, and by carrying the reduction still further there would in all probability be a complete transformation into metallic silver, water, and carbon dioxide, along with itaconic or the kindred acids. The oxide precipitated from the aqueous extract by means of potash contains metallic silver, and is only obtained in quantities too minute to admit of a determination of the relation of silver to oxygen of sufficiently decisive character. Faraday's suboxide of silver is also described, and found to be a modified form of ordinary oxide of silver.

Dr. Armstrong pointed out that at the recent Naturforscherversammlung at Berlin, von der Pfordten of Munich had adduced evidence in favour of the conclusion that an argentous oxide may be obtained.

Action of Trimethylenebromide on the Sodium Compounds of Ethylic Acetoacetate, Benzoylacetate, Paranitrobenzoylacetate, and Acetonedicarboxylate. By W. H. Perkin, jun., Ph.D.

ROYAL INSTITUTION OF GREAT BRITAIN.

The Forms of Seedlings: the Causes to which they are due.*

BY SIR JOHN LUBBOCK, BART., M.P., D.C.L., LL.D., F.R.S., M.R.I.

Sir John Lubbock commenced the lecture with some general remarks on the innumerable types of foliage among mature plants and the causes to which we might refer their various forms, the breadth of some and the narrowness of others, the differences of position, the differences of length in conifers, etc. He said that these considerations had led him to study the cotyledons or first leaves of seedlings. Cotyledons do not present such extreme differences as leaves; nevertheless, they afford a very wide range. Some are broad, some narrow, some are long, some short, some are stalked, some sessile, some lobed, some even bifid or trifid. At first sight, these differences seem interminable, and it might appear hopeless to attempt to explain them. Sir John Lubbock, however, pointed out, as regards many species, taking especially the commonest plants, such as the familiar mustard and cress, the beech, sycamore, pink, chickweed, etc., the conditions of their formation and growth, and it is beautiful to see the various reasons to which the differences are due, gradually unfolding themselves; the same result being sometimes brought about by very different circumstances, emargination of the cotyledons, for instance, being due to at least six different causes. He mentioned one curious peculiarity in the seedling of a species allied to the common mistletoe. It is a parasitic species, and its fruit, like that of the mistletoe, is somewhat viscid, so that it adheres to any plant on which it falls. But, even if it reaches the plant on which it grows, it may light on an unsuitable position—say, for instance, a leaf. What then happens? The radicle elongates for about an inch and then develops on its tip a flattened disk, which applies itself to the plant. If the situation be suitable, there it grows; if not, the radicle straightens itself, tears the berry from the spot where it is lying, curves itself, and then brings the berry down on to a new spot. The radicle then detaches itself, curves in its turn, and thus finds a new point of attachment. We are assured that this has been seen to happen several times in succession, and that the young plant thus seems enabled to select a suitable situation.

The form of the cotyledons, or seed-leaves, depends greatly on that of the seeds, long narrow seeds naturally in most instances producing embryos with narrow cotyledons. The cases, however, which can be so simply accounted for are comparatively few. Many plants with narrow cotyledons have flattened and orbicular seeds.

* Read Friday, May 21, 1886.

In such species, however, the cotyledons lie transversely to the seed. An interesting case is afforded by the pink family, where the pink itself has broad cotyledons, while the chickweed has narrow ones. In both cases the seeds are flattened and orbicular, but in the pink the seed is dorsally compressed, and the cotyledons lie in the broad axis of the seed; while in the chickweed seed is laterally flattened, and the cotyledons lie transversely to the seed.

Another very interesting case which he gave is that of the genus Galium, to which the common "cleavers" of our hedges belongs. Here also we find some species with narrow, some with broad cotyledons; but the contrast seems to be due to a very different cause. *Galium aparine* has broad, *Galium saccharatum* narrow, cotyledons. So far as the form of the seed is concerned there is no reason why the cotyledons should not be much broader then they are. The explanation may perhaps be found in the structure of the pericarp, which is thick, tough and corky. It is very impervious to water, and may be advantageous to the embryo by resisting the attacks of drought and of insects, and perhaps even if the seed be swallowed by a bird, by protecting it from being digested. It does not split open, and is too tough to be torn by the embryo. The cotyledons, therefore, if they had widened as they might otherwise have done, would have found it impossible to emerge from the seed. They evade the difficulty, however, by remaining narrow. On the other hand, in *Galium aparine* the pericarp is much thinner, and the embryo is able to tear it open. In this case, therefore, the cotyledons can safely widen without endangering their exit from the seed. The thick corky covering of *Galium saccharatum* is doubtless much more impervious to water than the comparatively thin test of *Galium aparine*. The latter species is a native of our own isles, while *Galium saccharatum* inhabits Algiers, the hotter parts of France, etc. May not then perhaps, he suggested, the thick corky covering be adapted to enable it to withstand the heat and drought? In this genus, as in many other plants, the embryo occupies only a part of the seed, being surrounded by a store of food or "perisperm." In many cases the embryo occupies the whole seed, and the cotyledons must, therefore, in large seeds, either be thrown into various folds, as in the beech, or be thick and fleshy as in the bean or oak. The reasons for their numerous differences open up an inexhaustible variety of interesting questions. Sir John gave a great number of examples, which were rendered clearer by means of numerous diagrams of seeds and seedlings.

In conclusion, he said it might be asked whether the embryo conformed to the seed, or the seed to the embryo, and showed that at least as regards certain species the former was the case; while the shape of the seed again might be shown to be influenced by considerations connected with the construction of the fruit. In reply to this he compared the seedlings of the sycamore and of the oak. In the sycamore the seed is more or less an oblate spheroid, and the cotyledons, which are long and ribbon-like, being rolled up into a ball fit it closely, the inner cotyledon being generally somewhat shorter than the others. On the other hand the nuts of the beech are triangular. An arrangement like that of the sycamore would therefore be utterly unsuitable, as it would necessarily leave great gaps. The cotyledons, however, are folded up somewhat like a fan, but with more complication, and in such a manner that they fit beautifully into the triangular nut. Can we, however, he said, carry the argument one stage further? Why should the seed of the sycamore be globular, and that of the beech triangular? Is it clear that the cotyledons are constituted so as to suit the seed? May it not be that it is the seed which is adapted to the cotyledons? In answer to this we must examine the fruit, and we shall find that in both cases the cavity of the fruit is approximately spherical. That of the sycamore, however, is comparatively small, and contains one seed, which more or less exactly conforms to the cavity in which it lies. In the beech, on the contrary, the fruit is at least twice the diameter, and contains from two to four nuts, which consequently, in order to occupy the space, are compelled (to give a familiar illustration, like the pips of an orange) to take a more or less triangular form. Thus then, he said in conclusion, in these cases, starting with the form of the fruit, we see that it governs that of the seed, and that the seed again determines that of the cotyledons. But though the cotyledons often follow the form of the seed this is not invariably the case. Other circumstances must also be taken into consideration, by the help of which much light can be thrown on the varied forms which seedlings assume.

Parliamentary and Law Proceedings.

FRAUDULENT VERMIN AND INSECT DESTROYERS.

For selling worthless "Vermin and Insect Destroyer," William Collins, Arthur Gillham, and Elizabeth Gillham *alias* Mills, were convicted at the Middlesex General Quarter Sessions on Wednesday last, and were sentenced, respectively, to eight, two, and ten months' imprisonment with hard labour.

Obituary.

STANISLAS LIMOUSIN.

We regret to record the death, on the 7th inst., in his fifty-fifth year, of M. Stanislas Limousin, a prominent French pharmacist, whose name will be familiar to many of our readers as having been associated with a method of administering pulverulent medicines enclosed between paste wafers known as "cachets médicamenteux." M. Limousin was an active member of the Paris Société de Pharmacie, to the meetings of which he frequently contributed papers on novelties in materia medica. M. Limousin was buried in Père-la-Chaise, on which occasion discourses were pronounced by M. Desnoix, President of the Société de Pharmacie; Dr. Constantin Paul, in the name of the Société Thérapeutique; M. Champigny, in the name of the Société de Médecine pratique; M. André-Pontier, President of the Société de Prévoyance des Pharmaciens de la Seine, and M. Capgrand-Mothes, President of the Société de Fabricants de Produits Pharmaceutiques.

Notice has also been received of the death of the following:—

On the 19th of March, Mr. John Richard Collins, Chemist and Druggist, Belmont Road, Clapham, S.W. Aged 67 years.

On the 19th of March, Mrs. Frances Rayner, Chemist and Druggist, Radcliffe Bridge, Lancs. Aged 94 years.

On the 27th of March, Mr. Henry Thackeray, Chemist and Druggist, Westgate, Hemley. Aged 56 years.

On the 30th of March, Mr. William Hay, Chemist and Druggist, Alford, Aberdeenshire. Aged 65 years.

On the 2nd of April, Mr. John Jeffes, Chemist and Druggist, Warwick Street, Liverpool. Aged 61 years.

On the 2nd of April, Mr. George Turner, Pharmaceutical Chemist, Honiton. Aged 68 years. Mr. Turner had been a Member of the Pharmaceutical Society since 1866.

On the 3rd of April, Mr. John Mortiboy, Chemist and Druggist, Railton Road, Herne Hill, S.E. Aged 46 years. Mr. Mortiboy was an Associate in Business of the Pharmaceutical Society.

On the 8th of April, Mr. Henry Rowson, Pharmaceutical Chemist, Chichester Street, W. Aged 54 years. Mr. Rowson had been a Member of the Pharmaceutical Society since 1859.

On the 12th of April, Mr. George Clarke, Blossom Street, Manchester. Aged 75 years.

On the 14th of April, Mr. John Williams Taylor, Chemist and Druggist, Dereham Road, Norwich. Aged 25 years. Mr. Taylor was an Associate in Business of the Society.

On the 14th of April, Mr. Charles Brooks, Chemist and Druggist, Wandsworth Road, S.W. Aged 36 years.

On the 15th of April, Mr. James Edwin Williamson, Chemist and Druggist, Bute Street, Cardiff. Aged 58 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Redwood Scholarship.

Sir,—I have read with considerable interest the report of the last meeting of Council, and rejoice to find the deed which settles the Redwood Scholarship does not bind the Council too closely in the matter of subjects for examination.

For a scholarship to be a fitting memorial of the services of an eminent teacher, it seems to me it ought to accentuate a leading feature of that professor's mind. Thirty years ago, with many others, I had the great good fortune to attend the excellent course of lectures, three a week, for ten months,—far too short a time, as the professor used to say, to deal exhaustively with the subject matter,—and if there was one thing more than another which impressed one, it was the thoroughly philosophic character of the mind which, while giving to each division its due attention, raised into prominence the dominant feature of the course, which anyone who will trouble to peruse the questions for prizes set by the Professor during the last quarter of a century will see at once was physics.

While giving to chemistry her proper place, he almost unconsciously let us feel that it was a skeleton science, that there was a something beyond chemistry; the loosening of proximate constituents, the separation of the molecules in analysis, the formation of new combinations by synthesis, was not all. The subtle force comprised in the word physics was the life of matter and the mother of form or state that shows the marvellous knitting together that shimmered on the boundary of sense, a boundary daily yielding still to pure induction.

May I ask then that in the subjects set for examination for the Redwood Scholarship, physics shall take a more prominent place than for the Bell Scholarships? The Professor is happily still with us, he can be consulted in the matter, and correct me if I am wrong.

There is another side to the question. Every year one lives, the more one feels that each one differs in his gift. To one is given music, to another numbers, to another a mole-like vision, to another that of an eagle, to another great penetration, and so on. In our calling, and more especially in the allied one of medicine, we want men of varied gifts; we do not want all our best men stamped as clever with the same die. For instance, a man who will utterly fail in arithmetic, or in languages, may excel in physics, and we lose his help and regulating influence because our gates to progress or help are closed against him. As our scholarships increase,—as increase they will, because the cause is good, for we work for the health of the people, and the well-being of the whole world,—let us so vary our subjects on each, that the Society may be very strong as a whole.

George Mee.

Note on Linimentum Terebinthinæ.

Sir,—After all the correspondence that has taken place respecting this liniment, and the excellent paper recently read by Emeritus-Professor Redwood, it requires some little audacity to re-open the subject. Considering, however, that pharmacists have in the past so frequently failed to produce a satisfactory preparation, and, hence, that they will probably fail in the future, one may venture to point to what is the cause of most, if not all, of the failures.

Last year Mr. Conroy, and, more recently, Dr. Redwood and Mr. Martindale, have stated that success is independent of the quality of materials used, and is to be attained chiefly by proper manipulation. But that dispensers may have a proper mastery of this preparation it is necessary to have a clear idea of the kind of manipulation requisite to obtain a good emulsion; and to this end a few experiments were made.

I conceived that no matter how the soap, water and turpentine might be mixed, the soap would certainly unite with the water and so provide a basis for an emulsion. This was verified by putting the soft soap, without any previous preparation, into a bottle with a wide mouth, and then adding the camphorated turpentine and water; this was shaken for a little while and then allowed to rest over night. On the following morning the greater portion of the soap was dissolved; but not entirely, several small pieces being visible. The mixture was now shaken very vigorously, with the result that shortly it assumed a creamy consistence, and passed, ultimately, on further shaking, into the gelatinous condition. This experiment was repeated, with the sole difference that the soap and water were first rubbed together in a mortar, and a perfectly homogeneous jelly was produced. In these experiments the whole of the ingredients were mixed together at once. Now, it is not my intention to suggest that this method should be followed in the pharmacy, especially as the shaking required is considerable, and sometimes a little too prolonged to be pleasant; but the fact that a good emulsion can be made under such circumstances shows that failures should never ensue, and that when they do it is undoubtedly because the operator's strength or patience has given way. That the turpentine proves no impediment to the union of the water and soap is quite as clearly shown, thus putting it in the dispenser's power to reclaim a bad preparation at any stage of the process. For instance, Mr. Martindale has pointed out the importance of carefully blending the first additions of the camphorated turpentine with the soap and water; but should this not take place the excess of turpentine may, after standing a little while, be poured out of the mortar, and the pestle freely applied to the remaining portion consisting for the most part of soap and water and a little turpentine. The first portions of the turpentine may be readily mixed by adding a few drops at a time to the soap and water, previously well rubbed together on a porcelain slab; when a thin paste has been obtained it may be transferred to a mortar or bottle, and the remainder of the turpentine added in quantities suited to the operator's energy.

The combination of the two "fluids" does not appear to be so much a matter of skill as of energy, although the proper selection of utensils and the gradual mixing of the "fluids" may to some extent reduce the amount required. This being the case, a batch of materials should never be put on one side as spoiled, because a good emulsion is readily producible from a bad one.

For the guidance of such as may be disposed to make the liniment by shaking, I may suggest that a bottle be used having a capacity at least one-third greater than the volume of the ingredients, and that the last third of the camphorated turpentine be added all at once, otherwise the liniment will be found too thick to shake, and so prevent the last portions of turpentine combining.

Manchester. William Kirkby, F.R.M.S.,
Pharmaceutical Chemist.

A Burette Nitrometer.

Sir,—Mr. Proctor, in some pharmacy notes published in the Journal a few weeks since, mentions a nitrometer made by him out of two glass syringes, which he said gave in his hands fairly accurate results for testing the amount of nitrous oxide in spt. æther. nitrosi; but he did not say how he graduated them. However, Mr. Blunt in the Journal of March 19, fully explains how to graduate two glass syringes and make a simple nitrometer, and on making one I found it to work pretty well. It is best to graduate the syringe which goes into the salt solution with a file, as a paper slip graduated is apt to come off, unless it is rendered waterproof by rubbing it with paraffin.

After using this nitrometer it struck me that I could make a better one by using a 1000 grain-measure burette for measuring the nitrous oxide given off, instead of the syringe, and I found that by fixing the point of the burette to the graduated ½ oz. glass syringe by means of about one inch of india-rubber tubing, and attaching to this a Mohr's clamp, I had a very good nitrometer ready for use.

To use it make a solution of salt—about 2 oz. to 8 oz. water—in a glass measure, insert the open end of the burette, press the clamp and suck the salt solution until it completely fills it; then pour 1½ drachms spt. æther. nitrosi into the graduated syringe and let 1 drachm run in, pour out the remaining ½ drachm and add the following solution, potassic iodide 15 grs., water 2 drachms, allowing 1½ drachms to run into the burette; pour out the remaining ½ drachm, then lastly add 1½ drachms acid. sulph. dil., B.P., and let 1 drachm run in. There will be a rapid evolution of nitrous oxide, and the salt solution in the burette will be depressed according to the amount liberated, which can be read off in a few minutes.

Having made half a gallon according to the B.P. and on testing it, I found it to yield nearly nine volumes of nitrous oxide. On testing the remains of some bought about eight months ago, I found it to yield only four volumes of nitrous oxide.

Both samples were also tested according to Mr. Proctor's thiosulphite of soda method, and found to agree very well with the volume test, and I must say that every chemist and druggist should test his spt. æther. nitrosi by this method, as mentioned by Mr. Proctor, in the Journal a few weeks back, as it is easy to do and fairly accurate for practical use, if ways and means cannot be found to apply the volume test of the B.P.

Glasgow. JOHN C. HUNTER, A.P.S.

A VERY SENSITIVE PLANT.

Sir,—Your always interesting review of the month is particularly so this month. There is one item, a case of poisoning by Robinia, somewhere in America, which recalls to my mind a somewhat "steep" story of an unnamed variety of American acacia which—the story, not the tree—went the round of the papers three or four years ago. The habitat of the species was said to be Nevada, and a western soil would seem most appropriate. The particular tree at the time when (as the novelists say) the story commences, was about eight feet high. These acacias are a sort of sensitive plant; when the sun sets their leaves fold together and the ends of the twigs coil up like a pig's tail. If the latter are touched the whole tree becomes manifestly "uneasy." But in 1883 a certain gardener had to remove the plant of which I tell from the pot in which it had been matured into a larger one. To use the gardener's expression, "it went very mad." Hardly had the transfer been effected ere its leaves began to stand up in all directions, "like quills upon the fretful porcupine," and soon the whole plant was quivering with emotion. At the same time it gave out a most sickening and pungent odour, "like that of a rattlesnake when teased." The smell so filled the house that it was necessary to open all the doors and windows, and it was an hour or more before the plant "calmed down" and folded its leaves in peace. After this one can hardly echo Mr. Lowell's question—

"Who'd expect to see a tater
All on end at bein' biled?"

Nothing would seem more natural in America. Is it to be supposed that this plant's extraordinary behaviour was merely an exhibition of individual eccentricity, and if so, may the same be hoped of the poisonous properties of the acacia referred to in your paragraph?

Epworth. C. C. BELL.

HUECHYS SANGUINEA.

Sir,—May I venture to call Mr. Moss's attention to an error, trivial in itself, but important from an entomological point of view? He describes *Huechys* as a "Coleopterous insect." A cursory glance will show any habitual "bug hunter" that the insect in question belongs to the order Hemiptera; it has the characteristic structure of wings, and the suctorial mouth extremely well developed, and shows these distinctive characters more markedly than most of our indigenous insects of the order. It has few characters in common with the order Coleoptera, except those which appertain to the class.

Huechys falls, I believe, in the sub-order Homoptera, and from its small antennæ and three-jointed tarsi would closely approach the Cicadariæ, but on this point I am not sure.

J. OLDHAM BRAITHWAITE.

Laboratory, 50, *Southwark Street, S.E.*

Erratum.—We have been requested by Mr. Moss to make the following correction in his paper:—On p. 844, col. ii., line 16 from bottom, it should read that the quantity treated as for liquor epispasticus was 7·574 grams and not 5·574 grams, as printed.

TESTING FOR ALBUMEN IN URINE.

Sir,—I see in a paper on urine by Mr. Saul, that "Dr. Pavy's pellets contain a mixture of ferrocyanide with citric acid." As this would interfere with the method of using the test, I wish to call attention to the fact that the pellets are made of ferrocyanide of sodium as the one, and citric acid as the other pellet.

Mr. Saul says the presence or absence of citric acid exercises no appreciable effect under any conditions of the urine, and also remarks that a delicate test for albumen is ferrocyanide of potassium; let him try citric acid and ferrocyanide of sodium, and then say if Dr. Pavy's pellets must be condemned.

66, *Oxford Street, London.* W. TEMPLE COOPER.

[*** Mr. Saul's objection to the use of Dr. Pavy's pellets must, we think, be understood as applying to urine testing as dealt with in his paper, and not to bedside testing by medical men. The remark on citric acid evidently applies only to Esbach's picric acid test, and not to that with ferrocyanide.—ED. PHARM. JOURN.]

Sir,—I would venture to suggest as a valuable supplementary reference to Mr. Saul's paper on Urinary Analysis in the Journal of Saturday last, Dr. Maguire's 'Albumens of the Urine,' *Lancet*, June, 1886.

33, *Corporation Road, Carlisle.* JAMES FOSTER.

A CORRECTION.

Sir,—Permit me to correct an error that escaped my notice in revising the proof of my remarks at the last Evening Meeting. The seeds there mentioned under the name of Lucerabo seed should have been written Lukrabo, and the name of the plant affording them should have been *Hydnocarpus* instead of *Gynocardia anthelminthica*, Pierre. These seeds have already been mentioned in this Journal, under the former name (see *Pharm. Journ.*, [3], vol. xv., p. 41).

E. M. HOLMES.

P. H. Marsden.—(1) *Draba verna.* (2) Too young to determine. (3) *Sedum reflexum*, with an immature fungus parasitical on the leaves. Please to send further specimens when the spores are mature. (4) *Parmelia physodes.* (5) *Cladonia pyxidata.* (6) *Calluna vulgaris.*

T. S. R.—As indentures are generally drawn up, the engagement and its responsibilities expire at a specified date.

G. W.—Clark's table of hardness will be found in the *Pharmaceutical Journal*, [1], vol. vi., p. 527; also in Frankland's 'Water Analysis,' and other similar works.

W. Y. Brevitt.—We have not been able to find the reference. In vol. xviii, p. 263, there is a paper containing some information respecting Boyle Godfrey, but it does not include the passage you require.

Jupiter.—We do not know.

Fustic.—The sample sent has the appearance of being an oxide of tiu lake.

Pharmacist.—We do not think it desirable that the criticisms contained in your letter should be published anonymously.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Newsholme, Flückiger, Hillington, Draper, C.A.J.

SPONGES

SUMMER SEASON, 1887.

CRESSWELL BROTHERS

Sponge Importers & Merchants,

2, RED LION SQUARE (next to Church), LONDON, W.C.

SPECIAL SHOW

FROM

Monday, 25th, to Saturday, 30th April, 1887, inclusive.

Messrs. Cresswell Brothers will devote their Warehouse and Show Rooms on the above dates to a Special Exhibition of several large parcels of Honeycomb, Fine Turkey, and other Sponges just landed. These will form the largest assortment of Sponges ever exhibited. Chemists will find special advantages in selecting their own goods from the bulk, as they are certain then to get the article most suitable to their trade. The prices will be found to be at least Ten per cent. lower than those of any other house.

SPONGES *Every kind.* **SPONGES** *Every quality.* **SPONGES** *Every size.*

Largest Stock in the World. Lowest Prices in the trade.

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MAWSON'S FILTERS

Proven by Analysis to remove Lead, Lime in excess, Sewage and Bacteria.

Manufacturers, MAWSON, SWAN & WEDDELL, Newcastle-on-Tyne.

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Prepared from the finest English Lavender without any foreign whatever. **Lavender Water.**

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Prices from 1/ to 6/.

BEDDARD'S

BELGRAVIA TOOTH PASTE.

Handsomely put up in large Jars, 1s. and 2s. 6d. each.

OF ALL WHOLESALE HOUSES.

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JOHN BEDDARD,

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THE PERFECT SURGICAL BANDAGE

Preferred to all Makes hitherto used.

In Cases of Twelve Six Yard Rolls, 2 inches wide, 3s. 9d.; 2½ inch, 4s. 6d.; 3 inch, 5s. 6d.; or, case containing twelve six yard rolls of each width, 13s.

Free by post, to any address in the United Kingdom, for prepaid orders only. Manufactured by

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PETROLEUM JELLY

EQUAL TO AND CHEAPER THAN VASELINE.

SANITARY FLUID AND SHEEP DIP,

THE CHEAPEST AND BEST DISINFECTANT.

Grease, Pitch, Asphalte, and all products of Tar and Rosin.

Samples and Prices on application.

GRINDLEY & CO. POPLAR, LONDON, E.

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DRUGS, OILS and CHEMICALS.

SPECIALITIES.—Glycerine of all gravities, Sulphur, Brimstone, and Beeswax. Leghorn Oils, Olive and Castor, Essence of Lemon and Bergamotte, Oil of Lavender and Thyme. Chloral Hydrate and Croton Chloral Hydrate.

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AS USED IN ALL THE GOVERNMENT MUSEUMS.

SUITED FOR ANY SUBSTANCE, FROM GLASS AND CHINA TO LEATHER, WOOD, OR IRON.

THE MOST USEFUL EVER INVENTED.

In Bottles at 6d. and 1s. (equal to three of the smaller), at Patent Medicine and Druggists' Sundries Houses, or W. J. FOULKES Birkenhead.

"laden with the scent of flowers,
And breath of odorous Spring."

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A Company of Merchants are now selling through SPINNER & CO. the choicest Teas that come from India and China at 2/8, 2/4, 2/-, and 1/8 a pound, in packets only. These are the perfection of Teas, and will please the most fastidious.—Agents wanted in every town and village. For Terms apply to SPINNER & Co., 60, Strand, London.

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A MONEY SAVING TEA. ABSOLUTELY PURE.

The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

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BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

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Prospectus and samples free on application.

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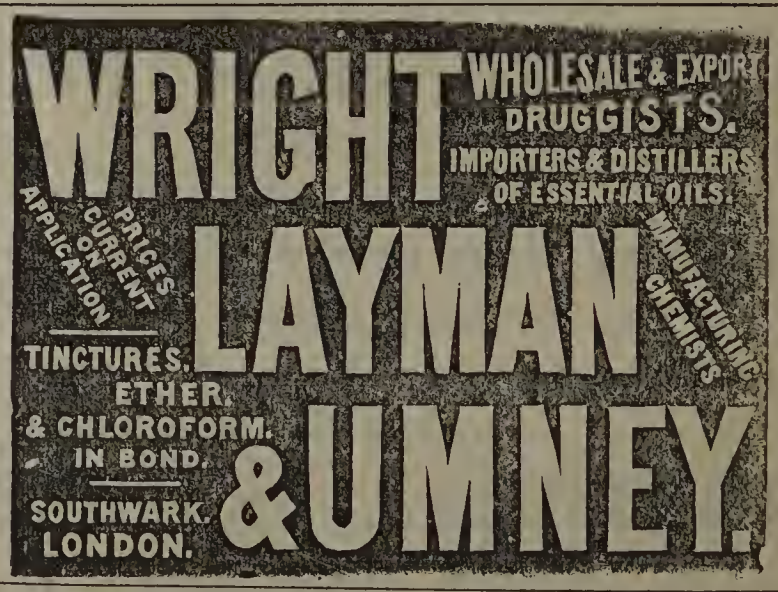
P.O.O. payable at head office. Bankers, the National Provincial Bank of England.



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(Successors to SIMS, SHAW & HORNBY. Founded 1786).

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MANUFACTURERS OF

Acid Sulphurous.	Emp. Picis.
Bird Lime.	Ess. Zingib (Soluble).
Dec. Senegæ Co. Conc.	,, Rosæ Co.
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Kay's New Transparent Cement for Broken Articles.

KAY'S COMPOUND ESSENCE
Of LINSEED, ANISEED, SENEGA, SQUILL, TOLU, &c. (with Chlorodyne).
"The Stockport Remedy" for Coughs and Colds.

LINSEED LOZENGES (Solidified Linseed Tea).
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KAY'S THROAT LOZENGES, for Relaxed or Sore Throat,
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PAINLESS SOLVENT for Corns and Warts.
LINUM CATHARTICUM PILLS (of the Purging Linseed).
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STRAMONIUM CIGARETTES.—For Asthma.
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IMPROVED CUE TIP FIXER.
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KAY'S TUBES for Feeding Bottles, with patent glass valve. Fit all bottles, and prevent children sucking air.
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SAPO-LINI, a Saponified Linseed Jelly; an excellent Toilet Soap.
All articles containing Scheduled Poisons are so labelled.
THE BEST ELASTIC STOCKINGS, LEGGINGS, SOCKS, KNEE CAPS, &c. 25% discount to Chemists.
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(TASTELESS.)

This Castor Oil is *expressly and solely* manufactured for us. It is produced by a process which removes the taste, hough not the efficacious properties.

In W. Qts., tins, or bottles with special label.

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HAWLEY.

(IN CAPSULES.)

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The boxes contain 24 capsules in each, are neatly got up and of a convenient size and shape for the pocket.

PRICE—1/ retail; 7/ doz.; 6 doz. 6/6 doz.
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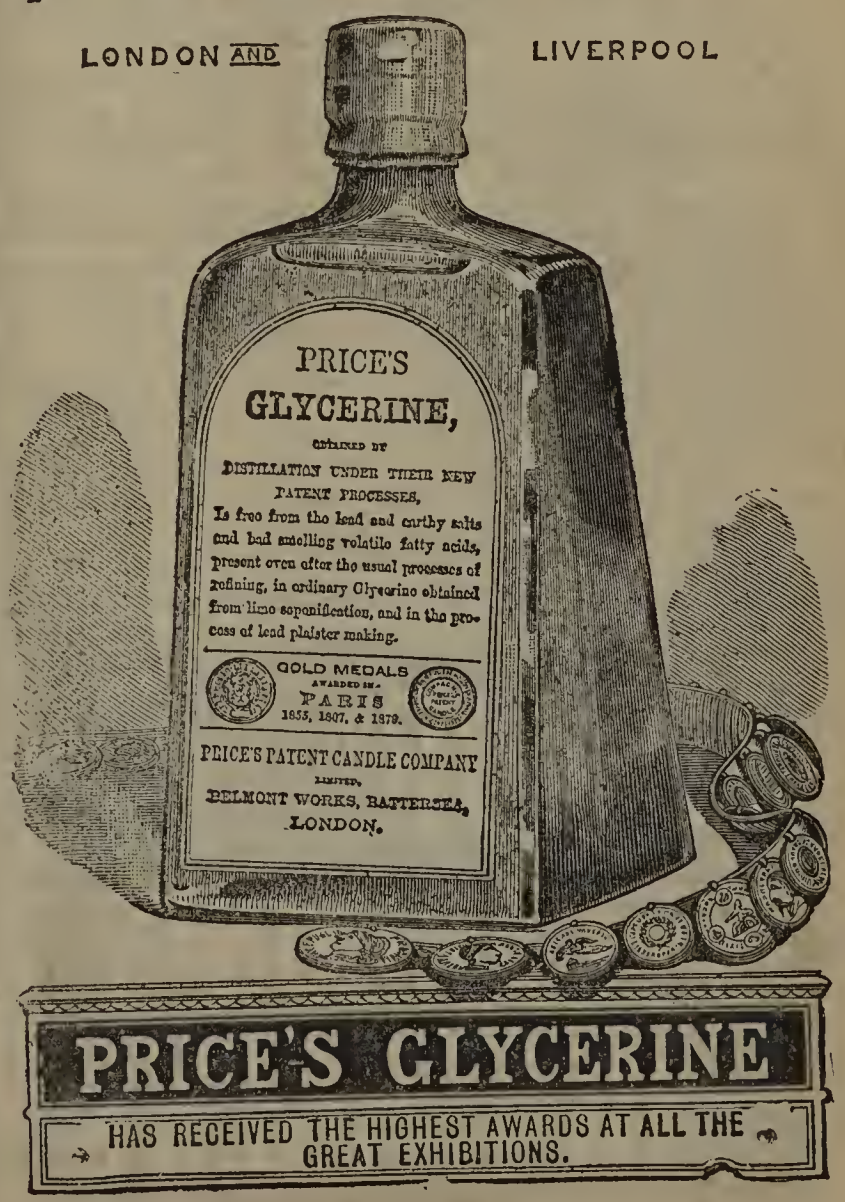

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Perfect in purity and uniform in strength.
The most efficacious antacid and mild aperient for delicate constitutions, ladies, children and infants.
Of all Wholesale Druggists.

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TRADE N & P MARK.

AËRATED WATERS,
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ESTABLISHED 1835.

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LEMONADE & GINGER ALE.

Each Bottle is protected by a Label bearing the Signature of the Firm.

Purity and Excellence of the Water certified by Analysis by Professor ATTFIELD, Ph.D., F.C.S.

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A Triumph as a Hair Restorer.

AN IMMEDIATE EFFECT.
PLEASANT AND HARMLESS.
FOUR COLOURS—GOLDEN, LIGHT BROWN, DARK BROWN, AND BLACK.

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For removing Superfluous Hair speedily and effectively without injuring the skin.
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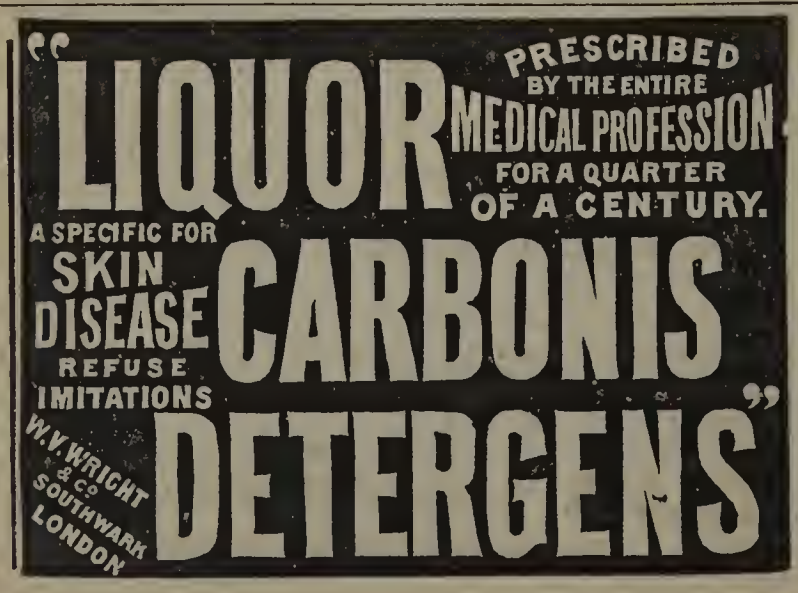

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Manufacturing Homœopathic Chemists

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Illustrated Prospectus and Trade Lists forwarded post free.

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Syr. Hypophosph. Hydrobrom. &c.

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Great Saving in the purchase of New Medical Dispensing Bottles and Phials at the Islington Glass Bottle Company (H. HARRIS & CO., Proprietors), 153, Upper Thames Street, City, London, E.C.

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FOR THE
SUPPLY OF PURE VACCINE LYMPH,
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SOLE AGENTS FOR

Dr. WARLOMONT'S CALF VACCINE.

Tubes, 2*s.* each. Half Tubes, 1*s.* each. Pomade in vials, 5*s.*
HUMAN VACCINE, from healthy children only, microscopically examined and source quoted.—Three tubes, two-thirds full, 5*s.*; Tubes one-third full, and Lancet Charged Points, 1*s.* each; Pin-points, 1*s.* 1*d.* each. Eighteen Charged Small Points, 5*s.*

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Office hours, 10 to 4; Saturdays, 10 to 2.

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To Wholesale Druggists, Chemists, Perfumers, &c.

WE are now supplying *Sp. Vin. Rect.*, extra and first qualities, at a very low figure for cash; free from smell, and perfectly clean, also in bond, for exportation.

Methylated Spirit & Finish, 64 O.P.

We are selling the above at the lowest possible cash price of the day, in quantities of Five Gallons and upwards. Quotations upon application.

Naphtha at current market rate.

Catalonian Sherry, 7*s.* 6*d.* per gallon, nett.

A good sound wine, combining body and strength, and specially adapted for medicated wines and other purposes.

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Is used by all the principal Wholesale Druggists, Pharmaceutists and Perfumers in town and country (54° to 65°), and will bear testing with Ammonia. It is allowed to be the best article for making Tinctures, Essences, and the most delicate Perfumes, being perfectly free from smell and fusil oil.

Packages to be paid for and allowed upon return.

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Also at DUNNING'S ALLEY and 1, LAMB ALLEY.

N.B —No connection with the house styled Bishopsgate Distillery and Wine Company.

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The Original Preparation of the Inventor,

Has been in use for over 60 years as an excellent remedy in cases of **Acidity, Indigestion, Heartburn, Gravel and Gout.**

Sold by all Chemists in Large-sized Bottles (the 1s. size containing just double the quantity usually sold at same price) at 1s., 2s. 6d. and 3s. 6d. each.

CAUTION.—Observe the signature of the Inventor on every label.

His **FLUID CAMPHOR** is a valuable remedy for **Sleeplessness** and **Weak Nerves.**

Bottles, 1s. and 2s. each.

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BARCLAY & SONS, 95, Farringdon Street, London.

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NO

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ON

SAVARESSE'S CAPSULES.

Messrs. EVANS, LESCHER & WEBB have received the following letter from the Solicitor of Inland Revenue:—

"SOLICITOR'S DEPARTMENT,
"SOMERSET HOUSE, W.C.
"LONDON, *April* 1*st*, 1887.

"GENTLEMEN,—I have to inform you that the boxes of Savaresse's Capsules, which you have submitted to me, are not liable to Medicine Stamp Duty.

(Signed) "D. H. MELVILL,
"Solicitor of Inland Revenue.

"To Messrs. Evans, Lescher & Webb."

WARREN'S REFINED WOOL FAT.

An excellent remedy for skin diseases. 1s. 9d. per lb.
In 4-lb., 7-lb. and 14-lb. tins. Tins free.

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A. & J. WARREN,

Wholesale Druggists, 23 & 24, Redcliff Street, Bristol,

Licensed Makers of METHYLATED SPIRIT AND FINISH.

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STODDART'S SEA SALTS.

INVALUABLE FOR RHEUMATISM.

Established nearly 40 years. Advertised continually.

1½d. Packets (in dozen boxes), 12/- per gross.

6d. or 2 lb. Boxes 4/- per dozen.	4/- or 28 lb. Bags 36/- per dozen.
1/2 or 7 lb. ,, 9/6 ,,	8/- or 56 lb. ,, 72/- ,,
2/- or 14 lb. ,, 18/- ,,	16/- or 112 lb. ,, 144/- ,,

Right of manufacture, good will, &c., purchased March 15, 1886.

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As supplied to the principal Governmental Public, British, American, Continental, and Oriental Hospitals and Societies.

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THE CLASSES FOR THE

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Are now at work, and will shortly be closed.

FEE, £3 3s. PER MONTH,

including use of all Chemicals, Apparatus and Dispensary and Museum Fees, no extra charges whatever being made.

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BY a young Pharmaceutical Chemist, as ASSISTANT. No salary to begin with. He passed Government Examination in Germany 2 years ago, and had since practical experience in large firms in Germany and Geneva. Knows French and German. Disengaged July next. A. R., 1463, care of Rudolf Mosse's Advertising Offices, 18, Queen Victoria St., London, E.C.

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AS ASSISTANT or DISPENSER. 9 years' experience. Age 23. Out-door preferred, and permanency. AQUA, Albion Villa, Rye, Sussex.

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AS ASSISTANT, in a good Dispensing business, or Dispenser to Surgeon. Age 24. Good references and experience. ALPHA, 123, King's Rd.. Reading.

AS MANAGER or out-door ASSISTANT. Age 35. Married. West-end and Continental experience. Speaks French and German. Good references. CHEMIST, 47, Church St., Camberwell.

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AS ASSISTANT in London. Disengaged shortly. Varied experience. Satisfactory references. Age 29. B. W. F., 165, Edgware Rd., W.

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DENTISTRY.—In consequence of increasing practice, a Pupil, who would have every opportunity of learning both Surgical and high class Mechanical Dentistry, in a Practice over 30 years' standing in a city in the Midland Counties. Address, DENTIST, 127, Gosford St., Coventry.

AN Indoor ASSISTANT. 24 to 26 years of age. With Minor qualification preferred. Apply, with usual particulars, enclosing photo (to be returned), W. T. FROST, 125, Lee Rd., Blackheath, S.E.

LOCUM TENEN. About the 9th of May, Give age, salary, experience and reference. J. B., Messrs. Evans, Lescher & Webb, 60, Bartholomew Close, London.

AN ASSISTANT (indoors), in a small country business. chiefly Dispensing. Address, H. E. BARTON, Kenilworth, stating age, reference, salary required and when disengaged, if carte be enclosed it shall be returned by next post.

POPLAR Union.—Appointment of a Resident DISPENSER.—The Guardians of the Poplar Union hereby give notice that, at their next meeting, to be held on Friday, the 6th May, 1887, at half-past three o'clock p.m., they will proceed to the Election of a DISPENSER for the Bow and Bromley Districts, at a salary of £80 per annum, with unfurnished apartments, coals and gas. Candidates must not be under 25 years of age, and must possess the qualification required by the Local Government Board. Applications must be on printed forms, which may be obtained at my office, and, accompanied by copies of testimonials, must be returned by Thursday, the 5th May, 1887, addressed—"Application for Dispenser." Candidates must attend personally at the Board Room, High Street, Poplar, at half-past three o'clock on the said 6th May, 1887. No travelling or other expenses will be allowed. Canvassing the Guardians will be a disqualification.—By Order,

G. HERBERT LOUGH, Assistant Clerk.

High Street, Poplar, 16th April, 1887.

AN APPRENTICE in a good class Retail and Dispensing business. Premium required. Comfortable home. Address, W. H. FOULKES, Pharmaceutical Chemist, 72, Northgate Street, Gloucester.

A COMPETENT, trustworthy ASSISTANT. Out-door. Age about 28. Industrious, steady, and capable of taking sole charge. Must be good salesman and obliging to customers. Mixed trade. Good wages to a suitable gentleman who desires a permanency. State full particulars to S. COOK, Chemist, Nottingham.

FOR for the middle of May, a competent ASSISTANT. Must be an accurate Dispenser, used to a good class family business, and able, at least, to Extract Teeth. Address, stating experience, age, salary and usual particulars, to PHARMACIST, care of Messrs. Davy, Yates & Routledge, 64, Park St., Southwark, London, S.E.

ASSISTANTS WANTED.

QUALIFIED Assistant. In-door. In a Mixed Dispensing and Family country business, 20 miles from London. Comfortable home. No Sunday duty. Must be thoroughly capable in all branches of the business. Also able to Extract Teeth. First-class references indispensable. Apply, personally, or by letter, to W. W. Flood & Co., 102, Blackman St., Boro', S.E., with references.

WHOLESALE.—Wanted immediately a Laboratory hand accustomed to make Citrate of Magnesia. Preference given to a total abstainer. Apply, with full particulars of previous experience, &c., to W. C. H., care of Davies & Davies, 46, St. Mary's Axe, E.C.

A QUALIFIED Assistant, to Manage a Branch shop. Encouragement liberal to an active, pushing and obliging Assistant. Apply, stating salary and references, to Messrs. Lynch & Co., Aldersgate St.

TO Students.—An Assistant, who thoroughly understands the Chemist's business, is required to give a portion of his time in return for board and lodging without salary. Duties very light, and plenty of time for reading and lectures. Apply (personally preferred) to Dr. Chandler, 22, Battersea Rise, Clapham Common (near Clapham Junction), S.W.

JUNIOR Assistant. In-door. Accustomed to good class business. State age, height, salary expected, and references, to W., care of Mr. Clark, 62, Denmark Rd., Manchester.

QUALIFIED Assistant. Age 25 to 35. Must be quick, and of good business habits and experience. One used to busy good class cash trade preferred. Salary, out-door, £100 to commence. Apply, with all particulars, enclosing carte, to G. S. D., Chemist, Oxford Avenue, Southampton.

J. E. RYDER, Chemist, Teignmouth (late Manager at Squire & Sons, Her Majesty's Chemists, London), has a vacancy for an in-door Apprentice. Must be smart and intelligent. Good opportunity for acquiring thoroughly practical training and business habits. Comfortable home. Pleasant seaside town. Reference to former pupil.

AN Assistant. Age from 26 to 30 years. With the Minor qualification. Single. One accustomed to country trade preferred. Salary, in-door, £50. Apply to J. Robins, Chemist, Woodford, Essex.

AN Assistant for a few months. Age about 21. A good opportunity for one studying. Four evenings a week given from 6 o'clock. State salary required, together with references from last two situations. Address, "South Coast," Meggeson & Co., Miles Lane, Upper Thames St., London.

A QUALIFIED Senior Assistant (in-door), for a good class Retail and Dispensing trade. Must be thoroughly competent and capable to manage if required. Liberal terms. Apply, with full particulars and photo (returnable), to Geo. Speechly, Bishop Stortford.

A JUNIOR indoor Assistant, about the middle of May. Must have been accustomed to a good class Dispensing business. Apply, stating age, height, and salary required to Chapman & Pain, Pharmaceutical Chemists, Cornhill, Ipswich. Enclose photo, which will be returned.

IMMEDIATELY, a competent Invoice Clerk for the Wholesale Drug trade. Must have good experience, quick at figures, and a smart penman. Address, Chemicus, care of C. Birchall, Advertising Agent, Liverpool.

QUALIFIED Dispensing Assistant. Apply, by letter, stating age, qualification, experience, salary required, and (if convenient) enclosing carte, which will be returned. Anderson & Virgo, Worcester.

ASSISTANTS WANTED.

BY May 2nd.—A good Junior. In-doors. Small salary and commission. Apply, in first instance by letter, to Mason, Chemist, High Road, Chiswick (Gunnersbury Station).

AN Assistant, not under 21 years of age, of good address. Must write a neat hand, and have had experience in dispensing. Apply, personally, to E. L. Hickey, 199, King's Rd., Chelsea, S.W.

JUNIOR Assistant at once. State all particulars, salary, reference, &c., and enclose photo, H. A Purnell, Chemist, Cheltenham.

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IMMEDIATELY. An Assistant, accustomed to good class trade. About 20 or 21 years of age. Apply, giving full particulars, age, height, salary expected, when disengaged, &c., to J. Williamson, 144, Church Rd., West Brighton.

AN experienced Assistant, of good address and steady business habits. One who has had good London experience. Qualified. Major preferred. In-door. Age about 25. Apply, personally if possible, or with full particulars, to W. Martindale, 10, New Cavendish St., W.

AN Assistant, age about 24 years, for General Retail, Dispensing and Prescribing. Personal application preferred, or send photo. Chemist, 34, High St., Putney, S.W.

COATED Pills.—Wanted, by a Wholesale firm, a person experienced in the manufacture of above. Apply, stating terms, with full particulars, to X., care of Messrs. Edwards & Son, 147, Queen Victoria St., E.C.

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A GENUINE Mixed Business in Northern seaside resort, capable of large increase. Returns under management £500. Well fitted and stocked. Good house. Low rent, on lease. Price £350. No opposition. Business in same town has done £1500 when population was less. Apply, W. G., 52, Raglan St., Hulme, Manchester.

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15 dozen gold labelled Shop Rounds and Ointment and Pill Jars, £9 15s. Four 4-gallon Carboys on ebonized stands, 13s. each. Four 6-gallon ditto, ditto, 15s. each. Six 8-gallon ditto, ditto, 20s. each. 24 best pink Shop Jars, 4 lb. size, labelled, 4s. 6d. each. Crystal Glass Drawer Knobs, 21s. per gross. Mahogany Case and Desk, 50s. Write for Illustrated List.—R. TOMLINSON & SONS, Medical Fitters, &c., Bond St., Constitution Hill, Birmingham.

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Personal applicants receive Messrs. O. & Co.'s direct attention and advice, where required, free.

VALUATIONS.

Terms for valuation on application.

Appointments by post or wire have immediate attention.

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32 Ludgate Hill, E.C.

LETTERS ON

PURE TEREBENE (Burroughs.)

The importance of specifying "BURROUGHS."

"SOUTH DEVON AND EAST CORNWALL HOSPITAL,
"*March* 15*th*, 1887.

"DEAR SIRS,

"* * * The Terebene we have used for a bad case of bronchitic asthma with the best results —no irritation of the throat as one finds with crude preparations—in fact, the patient could not take the so-called 'Pure Terebene' other than yours. * * *

"I remain, yours truly,
"R. M. LUCY, House Surgeon.

"To Messrs. Burroughs, Wellcome & Co."

The following is from the distinguished laryngologist and medical author, Dr. J. Solis Cohen:—

"1431, WALNUT STREET, PHILADELPHIA, U.S.A.,
"*October* 14*th*, 1886.

"GENTLEMEN,

"Please accept my thanks for the specimens of Terebene, Ozonic Æther, and Kepler Solution of Cod Liver Oil in Malt, kindly sent me. Your Terebene I have been prescribing ever since I have known it, in preference to any other.

"I am, yours truly,
"J. SOLIS COHEN.

"Messrs. Burroughs, Wellcome & Co."

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TINCTURE STROPHANTHUS.

[*Reprinted from the* LANCET, *March* 26*th*, 1887.]

"Few drugs have sprung more rapidly into favour than the African arrow poison Strophanthus. It was introduced to the notice of the profession by the distinguished pharmacologist, Dr. T. R. Fraser, Professor of Materia Medica, in the University of Edinburgh, who for fifteen years laboriously investigated its action both on man and the lower animals. It is now recognised as being not only a powerful heart tonic, but a most active diuretic. It is gradually replacing digitalis in popularity, and will in all probability in time entirely supersede it. It is not cumulative, and is especially indicated in all cases of cardiac affection attended with dropsy. It not only quiets the pulse, but by acting on the kidneys relieves the œdema and other attendant symptoms. It has also been found useful in purely functional irregularity. For a long time a difficulty was experienced in obtaining a thoroughly trustworthy preparation, but Messrs. Burroughs, Wellcome & Co. have recently made a 1 in 20 alcoholic solution which answers every purpose. The dose is from two to ten minims, and no hesitation need be felt in pushing it in suitable cases. It is made on a very large scale, some hundredweight or more being manipulated at a time, so that absolute uniformity of product can be guaranteed. The seeds alone are used, the husk and other parts being rejected. We have examined a specimen of the crude drug from which it is prepared, and have no hesitation in saying that it is the true species. The price of the tincture has been recently reduced, so that there is every prospect of its commanding a very extensive trial."

Reduced price of Tincture, 10s. per doz. ½-oz. bottles, 18s. per doz. 1-oz. bottles; Tabloids 2s. 3d. per 100, subject.

BURROUGHS, WELLCOME & CO., Snow Hill Buildings, London, E.C.

London: Printed by WILLIAM INGLIS RICHARDSON, 4 and 5, Great Queen Street, Lincoln's Inn Fields, and Published by Messrs. J. & A. CHURCHILL, 11, New Burlington Street

The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 879.] SATURDAY, APRIL 30, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

NOTICES.

ANNUAL GENERAL MEETING.

Notice is hereby given that the forty-sixth Annual General Meeting of the Members and Associates in Business of the Society will be held at 17, Bloomsbury Square, Middlesex, on Wednesday, the 18th day of May, 1887, at eleven o'clock in the forenoon, for twelve *precisely*, to receive the report of the Council, and to elect the Council and Auditors for the ensuing year.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

LIBRARY AND MUSEUM.

The Library is open daily from 9 a.m. until 10 p.m. (Saturdays, 9 a.m. to 2 p.m. only.) The Museum is open daily from 9 a.m. until 5 p.m., and from 7 p.m. until 10 p.m. (Saturdays, 9 a.m. to 2 p.m. only.)

THE JACOB BELL MEMORIAL SCHOLARSHIPS.*

TENABLE FOR ONE YEAR.

TWO SCHOLARSHIPS are offered annually, and come into operation at the commencement of the Session in October. Candidates for these Scholarships must be Apprentices or Students of the Pharmaceutical Society, under twenty-two years of age, and have passed not less, or been engaged not less, than three years in the pharmacy of a Registered Pharmaceutical Chemist or Chemist and Druggist.

Each Scholarship is of the annual value of thirty pounds, and is to be held for one year. In addition to the Endowment, the Council provides free Laboratory instruction and admission to the Lectures to the holders of the Bell Scholarships; and books of the value of five pounds, given by Mr. T. H. Hills, are divided equally between them.

The examination for these Scholarships takes place on the second Tuesday in July. Candidates desiring to compete must send notice to the Secretary, accompanied by Certificates of age and testimonials from their previous Employers or Masters as to capability, industry, and general conduct, on or before the first day of June.

Further particulars can be had on applying to the Secretary, 17, Bloomsbury Square.

* A scholar is supposed to be *commencing* his studies, or at least to have made only that progress which may be reasonably looked for during an apprenticeship. The object of the examination is to ascertain that the candidate has such an amount of ability, and affords evidence of having made such use of it in the acquirement of elementary knowledge, as will justify the expectation of his proving a successful student who may do credit to the appointment, and become a useful and accomplished member of the pharmaceutical body.

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2.—That letters addressed to initials or to fictitious names at a Post Office are not delivered by the Post Office Authorities, but are at once sent back by them to the writers.

3.—That all letters respecting the insertion of Advertisements should be endorsed on the envelopes "**PHARM. JOURN.**" and must be sent only to J. & A. CHURCHILL, 11, New Burlington Street, London, W.

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FOR THE

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On TUESDAY, MAY 17th, 1887.

THE PRESIDENT OF THE PHARMACEUTICAL SOCIETY IN THE CHAIR

Committee.

THE PRESIDENT.
THE VICE-PRESIDENT.

THE TREASURER.
CHARLES BOWEN ALLEN.
EDWARD NORTHWAY BUTT.

WALTER HILLS.
JOHN WILLIAMS.

The Committee will be glad to receive the names of any Gentlemen who will act as Stewards. The following have already consented to do so:—

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Fitch, Robert Owen.. ... 255, Well Sreet, South Hackney, E.
Fletcher, John .. .. .. Montpellier Avenue, Cheltenham.
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Francis, Geo. Bult .. .. 5, Coleman Street, E C.
Francis, Matthew R. .. 9, East India Dock Road, E.
Francis, William Hy. .. 5, Coleman Street, E.C.
Frazer, Daniel .. .. .. 127, Buchanan Street, Glasgow.
Froom, Wm. Hy. .. .. 75, Aldersgate Street, E.C.
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Gale, Samuel .. .. 225, Oxford Street, W.
Gange, Geo. .. .. .. Enfield Town, Middlesex.
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Greaves, William S. .. Ironville, near Alfreton.
Green, Isaac .. .. .. Tutbury, Burton-on-Trent.
Greenall, Alfred .. .. 10, South Road, Waterloo Lanes.
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Greenish, Thomas ... ... 20, New Street, Dorset Square N.W.
Greenish, T. E. .. .. 5, Bathurst Street, W.
Grose, Nicholas Male .. 5, Castle Street, Swansea.
Gulliver, William .. .. 6, Lower Belgrave Street, S.W.
Hackman, Leonard L. ... St. Clare Terrace, Landport, Hants.

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Hampson, Robert .. .. 205, St. John Street Road, E.C.
Hanbury, Cornelius .. Plough Court, Lombard Street, E.C.
Handley, Charles .. .. The Elms, Stoke Newington, N.
Hardy, Samuel C. .. .. 177, Regent Street, W.
Hart, James .. .. .. 131, Embden Street, Manchester.
Harvey, Edward .. .. 6, Giltspur Street, E.C.
Harvey, Wm. Rivett .. 98, Humberstone Road, Leicester.
Havard, Benjamin .. .. Narberth, Pembrokeshire.
Herring, William C. .. 40, Aldersgate Street, E.C.
Hill, Arthur B... .. .. 101, Southwark Street, S.E.
Hill, J. Rutherford.. .. 36, York Place, Edinburgh.
Hillen, John .. .. .. 6, Havelock Ter., Forest Hill, S.E.
Hills, Walter .. .. .. 225, Oxford Street, W.
Hodgkinson, Chas... .. 198, Upper Whitecross Street, E.C.
Hodgkinson, Wm. .. .. 198, Upper Whitecross Street, E.C.
Holmes, E. M... .. .. Bradbourne Dene, Sevenoaks.
Hopkin, Wm. King .. 16, Cross Street, Hatton Garden, E.C.
Hovenden, R. .. .. .. 31, Berners Street, W.
Howie, Wm. Lamond .. Cornbrook House, Eccles, Lancs.
Howlett, Samuel .. .. 4, Lindley Street, Mile End, E.
Hughes, John .. .. 3, West Street, Finsbury Circus, E.C.
Hughes, Thos... .. .. Red House, Llandilo.
Hugill, John .. .. .. 14, Miles Lane, E.C.
Ince, Joseph .. .. .. 11, St. Stephen's Avenue, W.
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Johnson, Thos. J. .. .. 35, Middle Hillgate, Stockport.
Jones, W. Harris .. .. 4, Maclise Road, W.
Jones, Wm. Hy. ... ... 406, Caledonian Road, N.
Kay, Samuel .. .. .. 7, Lower Hillgate, Stockport.
Kay, Thomas .. .. .. 7, Lower Hillgate, Stockport.
Kemp, David Skinner ... 27, Coverdale Rd., Shepherd's Bush, W.
Kingsford, Fredk. .. .. 54, Piccadilly, W.
Kinninmont, Alexander 69, South Portland Street, Glasgow.
Lansdown, Geo. .. .. 5, Warwick St., Charing Cross, S.W.
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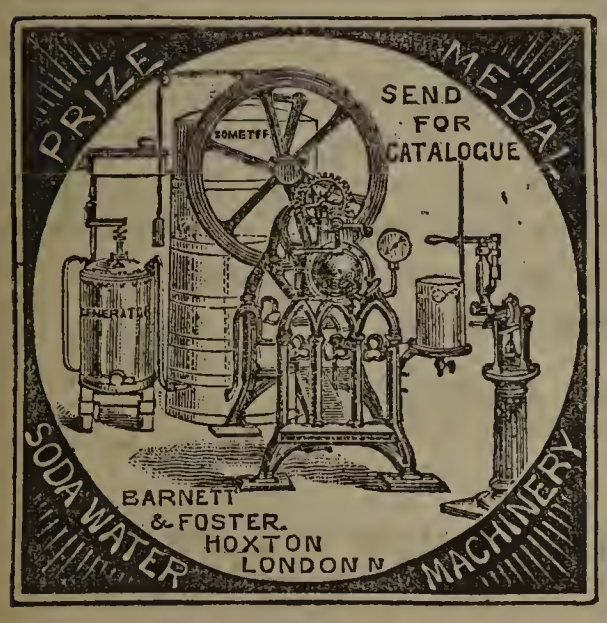

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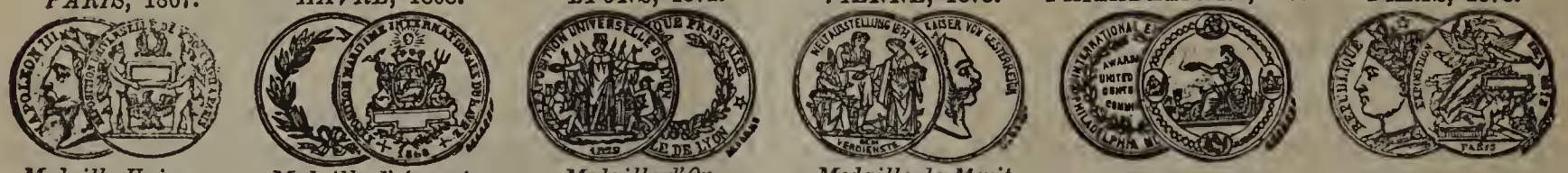

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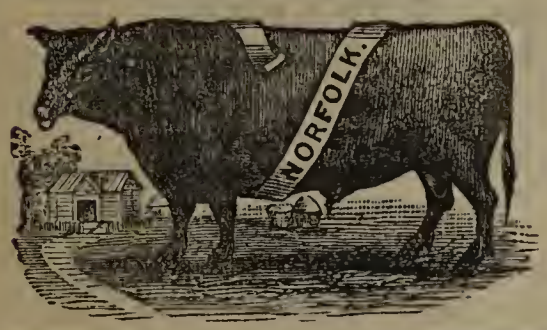

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"THE MONTH."

Calcium Gummophosphate.

The administration of compounds such as those known under the names "lactophosphate," "chlorhydrophosphate" and "citrophosphate of lime" is criticized by Dr. Sambuc (*Journ. Pharm.*, Apr. 15, p. 411), on the ground that it is an error to consider them to be soluble double salts in which the phosphate employed retains its primitive condition in the presence of the added acid. On the contrary, Dr. Sambuc states that the phosphate is decomposed, whether it be dicalcic or tricalcic, monocalcic phosphate being formed, together with calcium lactate, chloride or citrate, as the case may be. If this be correct the patient, in order to take one gram of the monocalcic phosphate, would have to swallow, also, 1·2 gram of calcium chloride, or a corresponding quantity of one of the other salts, a proportion that, considering the freedom with which these preparations are sometimes taken, can hardly be desirable. In order to meet this objection Dr. Sambuc proposes to use gummic acid, obtained by decomposing Senegal gum with hydrochloric acid and separating by dialysis, and states that when this is added to freshly-prepared dicalcic phosphate it combines with part of the lime, soluble monocalcic phosphate being formed, together with calcium gummate, which, being, practically, a regeneration of the gum, is not objectionable. As ordinary gum contains, in combination with gummic acid, lime, potash and magnesia equal to about 1·75 per cent. calculated as calcic oxide, 100 grams should, according to this theory, be equal to the solution of 10 grams of dicalcic phosphate. But in addition to this, it has been shown by Messrs. Lefort and Thibaut that natural gum arabic will dissolve 1 to 1·1 per cent. of bicalcic phosphate, possibly in consequence of the presence of some gummic acid not in combination, so that the total solvent power may be somewhat greater.

Croton Oil.

It will be remembered that at an Evening Meeting in 1878 (*Pharm. Journ.*, [3], viii., 705) Mr. H. Senier read a paper in which he reported that he had examined samples of English-pressed croton oil that proved soluble in alcohol only in proportion to the age of the sample, which was contrary to the recorded experience of Pereira and Redwood, and further that the portion soluble in alcohol exhibited the vesicating property, whilst the insoluble portion appeared to be inert. Subsequently, in 1883, in another communication (*Pharm. Journ.*, [3], xiv., p. 446), Mr. Senier gave his reasons for believing that whilst the vesicating property of croton oil resided entirely in the portion soluble in alcohol, the purgative property was confined to the portion insoluble. These conclusions not appearing satisfactory to Professor Kobert, the investigation was taken up by Herr von Hirschheydt, a pupil in the University of Dorpat. Upon the basis of the results obtained, Professor Kobert now (*Chem. Zeit.*, April 6, p. 416) attributes the activity of croton oil, both as a vesicant and as a purgative, to crotonoleic acid, not to be confounded with crotonic acid, but an acid discovered by Buchheim in 1873, the formula of which has not yet been made out. This crotonoleic acid is said to occur in croton oil both in the free state, in which it is freely soluble in alcohol, and in combination as an glyceride. The glyceride does not possess poisonous properties, but the free acid acts as a powerful irritant to the skin and the intestines (purgative). According to Professor Kobert the crotonolglyceride is attacked and split up like other glycerides by the ferments of the juices of the stomach, and the crotonoleic acid being set free then exercises its purgative influence. A similar result may be obtained by administering crotonoleic acid as a pill enclosed in keratin. Kobert is not of opinion, however, that the solubility of croton oil is dependent upon the proportion of crotonoleic acid it contains, but considers it to be connected with the age of the oil. Crotonoleic acid may be prepared by treating the portion of croton oil soluble in alcohol with a hot saturated solution of baryta in a water-bath, washing the stiff white paste that forms with cold distilled water to remove excess of baryta, and barium compounds with acetic, butyric and tiglinic acid, removing by heat traces of water, and repeatedly treating with ether, which only takes up the barium oleate and crotonoleate. The crotonoleate is separated by dissolving it out in alcohol, decomposed carefully with sulphuric acid, and the solution containing the free acid evaporated.

Bile Salts and Cod Liver Oil.

Having been impressed with the inconvenience attending the inunction of cod liver oil, as ordinarily practised in cases where the stomach is not in a condition to bear its internal use, Dr. Hare was led to consider whether, since one of the functions of the bile salts is to aid the passage of fats through animal membrane, they might not act in the same manner when applied to the skin in conjunction with cod liver oil (*Bost. Med. Journ.*, March 24, p. 279). Upon experiment this theory proved to be practically correct; a small quantity of a mixture of taurocholate and glycocholate of soda was found to materially hasten the absorption of the oil, and the rapidity of absorption was in direct ratio with the quantity of bile salts used. When half a teaspoonful of the oil was placed on the thin skin of the inside of the thighs, bile salts being added to one side only, and both thighs rubbed equally hard, it was found that the oil containing the added bile salts disappeared in about half the time required for the disappearance of the pure oil. Repeated applications of the oil and bile salts to the same spot within twenty-four hours failed to produce any sign of irritation of the cuticle. In preparing the mixture of bile salts, the plan recommended by Dr. Hare is to shake ox gall thoroughly with about three times its volume of alcohol, and after allowing the precipitated mucus to settle, filtering the supernatant liquid. Ether is then added in large excess to the filtrate, which causes after a time the separation of a pasty mass that slowly becomes crystalline; this is washed on a filter with a mixture of equal parts of ether and alcohol and afterwards dried.

Benzoyltropine as an Anæsthetic.

In a search made with the hope of finding some compound that might, like cocaine, possess anæsthetic properties hitherto unobserved, Professor Filehne was induced to turn his attention to the tropeines, atropine having been formerly regarded as a gently-acting local narcotic (*Berl. clin. Woch*, No. 7; *Med. Rec.*, Apr., p. 136). By experiment atropine was found to have a slight, but distinct, paralysing influence on the ends of the sensory nerves, whilst with homatropine this effect was very decided. Tracing some analogy between the splitting up of

atropine into tropine and tropic acid and that of cocaine into ecgonine, benzoic acid and methylic alcohol, and ecgonine proving to be inert, Professor Filehne inferred that the anæsthetic property was conferred by the acid radicle. Moreover, he found confirmation of this inference in the fact that just as homatropine stands between atropine and cocaine in its anæsthetic property, amygdalic acid, the acid of homatropine, is, in constitution, intermediate between tropic and benzoic acids, the acids of atropine and cocaine respectively, as is shown by the following formulæ :—

Benzoic acid . . . . . C_6H_5COOH

Amygdalic acid . . . $C_6H_5CH<^{COOH}_{OH}$

Tropic acid . . . . . $C_6H_5CH<^{COOH}_{CH_2OH}$

Professor Filehne was, therefore, led to anticipate that the compound resulting from the union of benzoic acid with tropine would have a greater local anæsthetic effect than homatropine. This was fully confirmed by experiment, benzoyltropine proving to be a powerful local anæsthetic, whilst when applied to the eyes it also exercised the action upon the pupils and accommodation characteristic of other tropeines. A number of "benzyl derivatives"* were therefore tested, and all proved to produce a decided local anæsthetic effect, benzylmethyltriacetonalkamine being the most powerful of those tried, benzyl quinine came next, and the weakest was benzyl morphine. This would seem to be a curious instance of a correct deduction being drawn from a false premiss, for apparently of all the compounds experimented with cocaine was the one which told most strongly against the theory that the anæsthetic *rôle* is played by the benzoic radicle. If this assumption were correct, benzoyl-ecgonine should have anæsthetic properties, which is contrary to common experience with this decomposition product of cocaine. Dr. Stockman reports on benzoyl-ecgonine (*Pharm. Journ.*, [3], xvi., 898), "the chief action of cocaine, namely, the paralysis of the sensory nerves, is quite absent; in fact, the relationship between the two substances seems to be as profoundly altered by the subtraction of a methyl group as is the case with methylstrychnine and strychnine."

Curare and Curine.

In some "chemical studies upon curare" Herr Böhm states that in a large number of the varieties of curare occuring in commerce there is present, besides the active base, another one that is inactive, which gives with metaphosphoric acid a characteristic voluminous white precipitate (*Berichte*, xx., Ref., p. 143). This base, which has been named "curine," is said to occur ordinarily in the aqueous extracts of curare, from many of which, by treatment with water, as much as 75 to 90 per cent. can be removed; others from which water takes up a smaller amount will give up a further quantity to dilute sulphuric acid. Upon rendering the solution slightly alkaline with ammonia the impure curine is thrown as a dirty green precipitate, which by successive purifications with ether, alcohol, and then again with ether, can be obtained in a crystalline condition. Curine is described as slightly soluble in cold water, freely soluble in alcohol, chloroform and dilute acids, somewhat less so in ether, and melting at about 160° C. to a clear pale yellow liquid. It is interesting to note that whilst curine in doses of 5 to 10 milligrams has been found quite inactive, Herr Böhm, by treating it with methyl iodide, has obtained the hydriodate of a new base that possesses a very intense curare action, 1 milligram killing a guinea-pig weighing 1·6 kilog. in an hour. But no conclusion can be drawn from the presence or absence of curine as to the richness of a particular sample of curare in the active curarine. After many attempts Herr Böhm succeeding in separating curarine as an amorphous yellow body, appearing orange-red in thick layers. Upon evaporating an aqueous solution with a little dilute acid to a syrupy consistence well-defined acicular crystals were gradually formed, but these turned out to be a decomposition product and without toxic action. The aqueous solution of curarine is without reaction, and does not appear to neutralize acids. The pure base is tolerably permanent in air, non-deliquescent and intensely bitter. The lethal dose per kilogram for guinea-pigs is stated to be 0·00035 gram.

* *Query*, benzoyl derivatives.

Narceine.

Some experiments made by M. Laborde with narceine specially prepared by M. Duquesnel so as to be free from morphine and codeine appear to have given results varying considerably from those obtained on previous occasions with what may be presumed to have been less pure preparations. M. Laborde states (*Archives de Pharm.*, April 5, p. 183) that he found this narceine much more active than any he had used before. A dose of two centigrams caused the disappearance of insomnia in an adult; and in cases of acute or chronic catarrhal bronchitis it rapidly relieved the cough. The quantity administered can be carried to four centigrams, but it should be given in fractions of a centigram at a time. It also soothes the paroxysms of hooping cough in children, and M. Laborde recommends its administration for this purpose in a teaspoonful dose containing one-quarter of a centigram of narceine. Its effect when injected subcutaneously into dogs, in quantities of one to three centigrams, is described as differing remarkably from that of morphine, the pure narceine producing a quiet natural sleep, whilst with morphine there is considerable disturbance.

Iodoform and Calomel.

An incompatibility observed in a mixture of iodoform and calomel has been investigated by Mr. Drescher, with a view to ascertain the chemical change that takes place (*Drug. Circular*, April, p. 75). Equal parts by weight of the two substances, when triturated together in a porcelain mortar, manifested no change of colour, nor was there any noticeable reaction or foreign odour. Some of the powder placed in a white vial, well corked and exposed to direct sunlight showed at the end of one hour signs of decomposition; after five hours the powder exhibited all phases of colour from whitish to yellow, with numerous greenish and greyish specks. There was also at the top some bright orange-red powder, which proved to be mercuric iodide. Another portion placed in an amber-coloured vial and exposed to direct sunlight, behaved somewhat similarly, except that the decomposition took about three times as long. A third portion, placed in an amber-coloured bottle and exposed to diffused light showed no signs of decomposition at the end of one week, but after two weeks change was quite evident. Some of the powdered mixture gently heated in a test tube gave off the odour of chloroform, especially when

the iodoform and calomel were used in proportional quantities, and there was a formation of mercurous iodide, which upon the temperature being raised, was converted into mercuric iodide. The reaction supposed to have taken place is—

$$2CHI_3 + 3Hg_2Cl_2 = 2CHCl_3 + 3H_2I_2.$$

Solubility of Lithium Carbonate.

With respect to the solubility of lithium carbonate in water at ordinary temperatures, statements have hitherto been fairly uniform, most authors giving it at 1 in 100, only Kremer differing in stating it to be 1 in 130 at 13° C. But in respect to its solubility at higher temperatures, authorities are much more at variance, it having been variously described as being "less soluble," "equally soluble," and "more soluble" in hot than in cold water. In order to clear up this discrepancy, some experiments have been made by Mr. Carter Napier Draper, who reports (*Chem. News*, April 15, p. 169) that he found the solubility of lithium carbonate in water at 15° C. to be 1·4787 per cent., and in water at 100° C. 0·7612 per cent. According to these results, therefore, the solubility of the salt in water at ordinary temperatures is nearly 50 per cent. greater than usually stated, whilst water at 100° C. dissolves rather less than one-half the quantity it is capable of dissolving at 15° C.

Ammonia Impurity in Sodium Bicarbonate.

According to Herr Thümmel (*Archiv*, Mar. 31, p. 245), sodium bicarbonate manufactured by the ammonia process is occasionally met with containing ammonium carbonate, the samples being almost perfectly free from chlorine, but having a disagreeable harsh taste. He reports that in one case, commercial sodium bicarbonate was found to contain more than 10 per cent. of ammonium carbonate, and he argues therefore that the application of a test for this impurity is indispensable. The German Pharmacopœia provides as a test for the presence of ammonia, that the salt when treated with soda solution shall not give off the characteristic odour, or the odour test may be applied by heating a little of the dry salt in a test tube. But Herr Thümmel points out that these tests are uncertain when the ammoniacal impurity does not exceed one per cent. He prefers a solution of mercuric chloride, which is already used as a test for the presence of monocarbonate. If one-half per cent. of the impurity be present, mercuric chloride produces in the solution immediately a flocculent white precipitate which upon standing becomes yellowish. The impurity would also be indicated by the B.P. perchloride of platinum test.

Toxicity of Urine.

Some experiments communicated to the Société de Biologie by Messrs. Charsin and Roger (*Archives de Pharm.*, April 5, p. 184) appear to indicate a considerable diversity in the degrees of toxicity of urine from different animals. It was found that the urine secreted by a rabbit in twenty-four hours is capable of killing an animal of 4·284 kilograms body-weight; that from a guinea-pig, one of 5·663 kilograms; and that from a dog one of 3·317 kilograms. Under the same conditions the urine from a man had a toxicity equal to only 461 grams. It was also ascertained that inanition diminishes the toxicity of the urine considerably, and that the same result follows the use of a milk diet. This last observation appears to have a bearing upon the beneficial influence known to be produced in such disorders as uræmia by a milk diet.

Fasting and Poisons.

Some interesting information was also communicated to the same Society by M. Roger as to the influence of the condition of hunger upon the power of animals to resist the poisonous action of alkaloids. It was stated that either quinine, atropine or nicotine introduced into the peripheral venous system of a rabbit after it has been kept without food for twenty-four hours is only four-fifths as toxic as if introduced whilst digestion is going on. On the contrary, if the alkaloid be introduced into the portal vein, the toxic dose whilst in digestion is nearly twice the quantity required during fasting. Fasting would therefore appear to tend to deprive the liver of its power to arrest the alkaloid, and the disappearance of this property coincides with the diminution of the glycogenic function of the liver. But if sugar be given to the animal three hours before making the experiment the liver again recovers its lost property.

Diastase.

It is well known that diastase, like other ferments, has its activity impaired under certain conditions, one of them being a relatively high temperature. An attempt has been made by M. Bourquelot (*Journ. Pharm.*, Apr. 15, p. 103) to trace the steps in this deterioration by comparative experiments as to the extent to which it influences the power of diastase to effect the hydration, or degradation of starch, as indicated by the reducing power developed through the formation of successive molecules of maltose. It was found that when the action of diastase upon starch was allowed to proceed under normal conditions the final product had a reducing power upon cupric solution equal to about 52 per cent. of what it would have possessed had the whole of the carbohydrate been converted into glucose; the number 52 is therefore taken as the standard of the reducing power. But when 10 c.c. of a 1 per cent. mixture of starch paste and water was kept in contact for three days with 10 c.c. of a one-half per cent. solution of diastase that had previously been kept for twelve hours at a temperature of 68° C., the product only had a reducing power of 28·4. With increasing quantities of diastase, up to 60 c.c. and the same quantity of starch the reducing power remained practically the same, the highest figure reached being 28·6; whilst with 10 c.c. of diastase and increasing quantities of starch the figures only varied between 30·1 and 32·9. The action of the deteriorated diastase, however, proved to be, as far as it went, as rapid as that of normal diastase. It would appear, therefore, that under the influence of heat, it is not the quantity of the ferment that is diminished but the quality that is modified; unless it be supposed that natural diastase consists of two or more soluble ferments, which are destroyed in succession by a rise of temperature.

Pepsin.

Some recent experiments by M. Sundberg (*L'Union Pharm.*, Apr., p. 145) appear to throw considerable doubt upon the ordinary assumption that pepsin is of an albuminoid nature. The most superficial layer of gastric mucus was scraped from calves' stomachs, triturated with sodium chloride and sufficient water added to make a saturated solution, which after standing two days was submitted to dialysis to remove the sodium chloride. The solution of pepsin so obtained, though it pos-

sessed considerable digestive power, contained only traces of albuminoid matter; but in order to purify it further, the acidulated solution was kept for several days at a temperature of 40° C., after which calcium chloride and sodium phosphate were added, and it was neutralized with very dilute ammonia. The precipitation had to be repeated two or three times to bring down all the pepsin, which was then washed, dissolved in a little 5 per cent. hydrochloric acid and the solution dialysed. The solution, after the removal of the salts, was very active, but it no longer gave any of the reactions for albuminoid matter, yielding no precipitate with either neutral or basic lead acetate or platinum perchloride. Five or six volumes of absolute alcohol, however, caused the formation of a slight precipitate which with acidulated water gave a very active solution.

Vulcanized India-Rubber.

According to M. Balland the gradual loss of elasticity frequently observed in articles made of vulcanized india-rubber is due to the slow formation of sulphuric acid by the action of atmospheric moisture on sulphur present in the rubber. He recommends that the action of the acid should be prevented by occasional prolonged washing of the article with water, or with water rendered slightly alkaline (*Journ. Pharm.*, Apr. 15, p. 417). In this way he has been able to maintain drainage tubes in a supple condition for a considerable time.

Huamanripa.

A Chilian plant, called by the natives *Huamanripa*, has recently been reported on by M. Bignon, of Lima, who says that it possesses a deserved reputation as a specific in all diseases of the respiratory tract. It grows only on the slopes of the Cordilleras at a considerable height, and is a small composite plant belonging to the genus *Cryptochæte*. It has long lanceolate leaves, and flourishes from January to May, after which it disappears, although the rhizome remains. It is said to be very aromatic and resinous. An infusion is used, made from 25 grams of the leaves to a litre of water, which is bitter and aromatic; if made of greater strength it causes nausea. According to Dr. Zapater the infusion increases the circulation, accelerates the cardiac movements, and augments the secretions, especially the flow of saliva. In larger doses it causes vomiting, excessive perspiration, and diminishes the number of pulsations, as well as the respiratory movements, and lowers the temperature. In pleurisy and inflammation of the lungs it seems to have almost a specific effect, according to Dr. Zapater. When it is desired to prevent nausea, a little brandy is given with the infusion (*Am. Drug.*, p. 75).

Chinese Anæsthetic.

A curious account of a Chinese anæsthetic is given in *Nouv. Rémèdes* (April, p. 165). It appears that Dr. W. Lambuth mentions in his third annual report of the Soochow Hospital, an experiment made, at the suggestion of a Chinese doctor, with this preparation. A substance resembling wax, but harder, and semi-transparent, in the form of a tablet, was cut into small pieces and digested in water for twenty-four hours, together with a small white woody excresence. The liquid was then found by Dr. Lambuth to possess well marked anæsthetic properties. It was found that a numbness of the lips and tongue was produced, and that the finger immersed in the solution for some minutes could then be pricked with a needle without any pain being felt. The tablet was described as being the juice of the eyes of a frog. It was probably the substance obtained by the Chinese by placing a frog in a jar containing flour and irritating the animal, when it exudes a liquid which forms a paste with the flour. This is then dried and made into cakes bearing some resemblance to button lac.* If the anæsthetic property be due to the frogs' excretion, and not to the white woody excrescence above mentioned, the fact suggests the possibility of the animal using the secretion to deaden the pain to which it might be subjected by its enemies.

Aseptol.

Aseptol is recommended in the *British Journal of Dental Science* for the treatment of gingivitis and pyorrhœa. A 3 per cent. solution is used, and is injected between the gums and teeth every three days, for a couple of weeks. This treatment is said to reduce chronic swelling, arrest the flow of pus, restore the gingival margins to their natural shape, and cause them to be free from tenderness.

Heritiera littoralis.

In the April number of *Nouveaux Rémèdes*, Messrs. Heckel and Schlagdenhauffen conclude their examination of the false kola (*Heritiera littoralis*). The results obtained indicate that the seeds contain about 5 per cent. of tannin, analogous to that of kola nuts, in which it is present in only half that quantity. They do not contain any caffeine. The proportion of fatty matter in the false kola nuts is ten times as much as that in the true kola nut.

Orthosiphon stamineus.

M. C. Périnelle, in the *Répertoire de Pharmacie* (p. 191), speaks highly of the value of *Orthosiphon stamineus* (see *ante*, p. 267) in urinary diseases. It has been experimented with by Professor Guyon at the Necker Hospital and elsewhere, and judging from the results obtained, he believes that it is destined to be introduced into the Pharmacopée Française. A plant has already been received in the Jardin des Plantes, and is flourishing there. A kilogram of the plant affords about 195 grams of aqueous extract. It appears to contain a volatile oil.

Rhamnus Purshiana.

The series of interesting pharmacognostical notes communicated by Professor Schrenk is continued in the April number of the *American Druggist* (p. 61). He points out that the bark of *Rhamnus Purshiana* may be distinguished from that of *R. Frangula* by the presence of sclerenchymatous cells of most irregular angular shape, wedged together so as to form large compact groups, which increase in size and number toward the surface; to these the short fracture of the outer bark is due. The sclerenchymatous cells are absent from the bark of *R. Frangula*.

Coca Leaves.

With respect to coca leaves Professor Schrenk remarks that the lines on the under surface of the leaf are formed by a narrow band of tissue consisting of several rows of elongated oblong cells, which contrast very much with the polygonal cells of the epidermis bordering these lines. A cross section through one of these lines shows that it is a ridge consisting of a subepidermal strand of collenchymatous cells. There is no connection, as has been stated, between the lines and the veins of the leaf. He believes that the lines serve as an elastic stiffening of the blade of the leaf.

* A specimen of this curious medicament, presented by Mr. A. C. Abraham, may be seen in the Museum of the Pharmaceutical Society.

Professor Schrenk also points out the occurrence on tobacco leaves of curious branched glandular hairs, which he thinks may be of diagnostic interest. These hairs appear, however, to be difficult to find, and in some pieces of leaf from a cigar factory he found none.

Nicotiana Tabacum.

M. Patrouillard, who on a previous occasion pointed out the adulteration of senega root with that of *Asclepias Vinc toxicum*, has now found another adulteration of the same drug in the form of the rootlets of *Ruscus aculeatus* (*Journ. Pharm.*, April, p. 364). These differ from senega root in the paler colour of their external surface, and in being cylindrical and of nearly uniform thickness throughout. The transverse section also has a nearly uniform white colour, whilst in senega the cortical portion is darker than the meditullium, especially in the layer immediately surrounding the meditullium. The senega root examined by M. Patrouillard contained about a quarter of its weight of the adulteration.

Adulteration of Senega.

Some little interest has been excited by the announcement of the discovery of a new and remarkable variety of asparagus on the steppes of Akhal-Tekiz. It has not been botanically identified, but it is represented as growing perfectly wild, the stalks being nearly as thick as a man's arm and attaining a height of five or six feet, so that one of them is said to suffice ten Russian soldiers for a meal. If the preference of experts for wild asparagus finds justification in this variety, and its flavour is described as equal to that of the best European kinds, asparagus lovers may have a good time before them.

A New Asparagus.

The investigations of Professor Strasburger on the extent to which pollen grains from one plant will germinate on the stigma of another species have led him to the conclusion that there is a diastatic ferment in the pollen grain, which can often be recognized by its rapid and energetic action on starch paste. He believes that this ferment varies in different species, and that it probably is of importance to the nutrition of the pollen grain when the latter passes through the tissue of the style, and that it enables the pollen tube to pierce the cell walls and also the embryo sac. M. P. Van Tieghem has shown that pollen has the power, at least in the case of the hyacinth, crocus, narcissus, wallflower and violet, to invert sucrose into glucose. This power appears to be very considerable, judging from the small amount of pollen required to produce a considerable quantity of glucose (*Journ. Roy. Micro. Soc.*, pp. 269, 273). It would be interesting to know how far pollen is concerned in the manufacture of honey by bees, especially when they are fed on cane sugar. The spores of *Lycopodium* and of some ferns appear to possess, but in a less degree, this inverting property of pollen.

Ferment in Pollen Grains.

Mr. Worthington Smith gives an interesting account, in the *Gardeners' Chronicle* (April 23, p. 545), of the St. George's mushroom. He remarks that it derives its name from generally appearing about St. George's Day (April 23). To this mushroom the name of "*mouçeron*" is given in France, because it grows in mossy places, and from its French name the English word mushroom is derived.

Agaricus gambosus.

A fungus which is known to affect henbane leaves in Europe, *Peronospora Hyoscyami*, De Bary, has lately been noticed on the leaves of *Nicotiana glauca* in California, and it is feared lest it may spread to the tobacco plantations in the United States (*Nature*, March 31, p. 321). As this fungus has been found in England, there is a possibility of its spreading to the tobacco cultivated in this country, which grows under conditions less favourable to its vitality than in the United States.

Peronospora Hyoscyami.

On the young leaves of *Amygdalus communis*, as well as on those of the peach, plum and cherry, nectariferous glands are found, which are stated by Sig. L. Macchiati to vary in size according to the time of day, being largest in the morning and smallest in the afternoon. The object of these glands appears to be to protect the flowers against the attacks of caterpillars. The glands disappear altogether from the mature leaves (*Journ. Roy. Micro. Soc.*, p. 267).

Nectaries of Almond Leaves.

Mr. Meehan, in the *Proc. Acad. Nat. Sci. Phil.* (*Nature*, March 31, p. 521), has called attention to relation of insects to the flowers of *Cassia marilandica*. He points out that the pollen seems never to burst the anther cases. These should open by pores at the apex, but the membrane there is only opened by insect agency. The insects pitch on the three lower and longer anthers, and pierce only the four upper and shorter anthers, so that the lower ones do not appear to be of any use, although they are full of pollen. Mr. Meehan expresses the opinion that the dependence of a plant on insect aid is an indication that its race is nearly run, and that the opposite assumption has been an injury to the study of the main questions of fertilization.

Cassia marilandica

Mr. Burbidge has lately directed attention to the curious fact that the foliage or erect leaves of the flat-leaved group of narcissus always twist from left to right, whereas the floral leaves and perianth segments show a tendency to twist from right to left. The only exceptions noticed appeared to be in the Corbularias and *N. triandrus*. In the former, however, the foliage leaves often become reflexed, and the perianth leaves are reversed as compared with those of the daffodil (*Gard. Chron.*, Apr. 2, p. 454).

Spiral Growth of Leaves.

Leclerc du Sablon points out (*Ann. Sc. Nat.*, v., 1) that a relation exists between the sensitiveness of tendrils and their structure. The side of the tendril most sensitive to contact is that on which the greatest number of fibres with thin walls or of very elongated cells are found. Thus the tendrils sensitive on one side only, as in the *Cucurbitaceæ* and *Passifloreæ*, present these fibres only on that side, and in those which are sensitive on their whole surface, as in the *Ampelidæ*, the fibres are symetrically placed in relation to the axis.

Sensitiveness of Tendrils.

Two new mosses have recently been added to the already long list of the British flora, viz., *Eurhynchium abbreviatum* and *Rhyncostegium rotundifolium*; the former was discovered in Herefordshire, and the latter in Somersetshre. *Webera cucullata* has also been found in Rossshire, and a description of it is given in the *Scottish Naturalist*, April (p. 91). Some interesting notes on new and rare British mosses are given in the *Journal of Botany* (p. 111) by Mr. Boswell, in which he states that *Tortula canescens*, which had not been found in this country for many years, has lately been found in Cornwall. It has also been found in Scotland in several places.

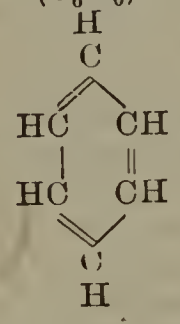
New British Mosses.

THE STRUCTURAL FORMULÆ OF SOME NEW ANTIPYRETICS.

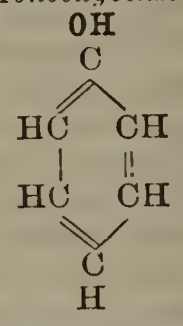
An interesting paper in the *Pharmaceutische Cen'ralhalle* (March 31, p 157) is devoted to a graphic representation by means of structural formulæ of the chemical relation to one another and to benzol and pyridine of a considerable number of the compounds that have been introduced during the last few years as antipyretics, The relation to one another is conveniently shown by printing the substituting group characteristic of each particular compound in thick type.

Of the oxy-derivatives of benzol, in which hydrogen is replaced by hydroxyl (HO), reference is made to *Phenol*, *Resorcin* and *Hydroquinone*. The reader is assumed to possess a general knowledge of the methods of preparing these bodies, as well as of the differences in the isomers dependent upon the different position of the substituted group in the molecule. They are then represented as follows:—

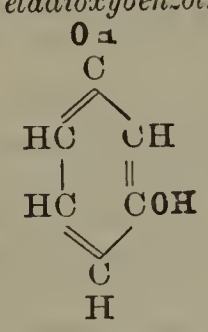
Benzol (C_6H_6).



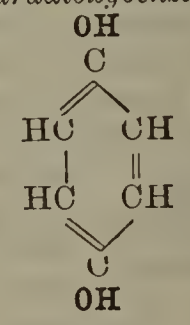
Phenol (C_6H_6O).
Carbolic Acid.
Monooxybenzol.



Resorcin ($C_6H_6O_2$).
Metadioxybenzol.

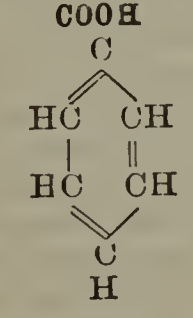


Hydroquinone ($C_6H_6O_2$).
Paradioxybenzol.

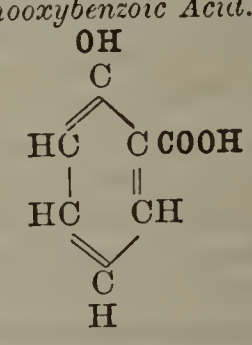


Next come *Benzoic acid* and *Salicylic acid*, in one of which carboxyl (COOH) replaces one atom of hydrogen, and in the other carboxyl and hydroxyl replace two atoms of hydrogen.

Benzoic Acid ($C_7H_6O_2$).

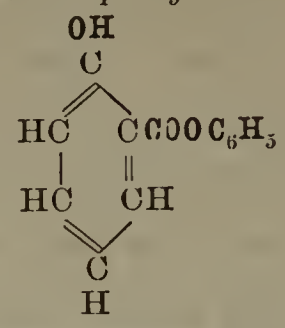


Salicylic Acid ($C_7H_6O_3$).
Orthooxybenzoic Acid.



The salts of these acids are formed by a base taking the place of the hydrogen of the carboxyl group. Quite analogous to such salts in its relation to one of these acids is the compound that has recently been introduced under the name "*Salol*," which is the phenyl ether of salicylic acid. It is prepared by heating a mixture of proportional quantities of phenol sodium and sodium salicylate with phosphorus chloride, dissolving out with water the sodium chloride and phosphoric acid formed and crystallizing the salol from alcohol. Or phosgene gas is passed at a moderate temperature through a mixture of phenol sodium and sodium salicylate in proportional quantities, the sodium chloride dissolved out from the product with water and the salol crystallized from alcohol.

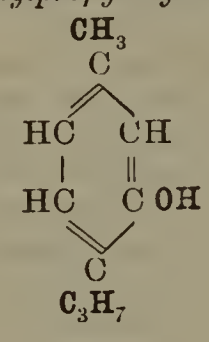
Salol ($C_{13}H_{10}O_3$).
Salicylic acid pheny ether.



It will be seen from the formula that the monovalent radical phenyl (C_6H_5) here takes the place of the hydrogen of the carboxyl.

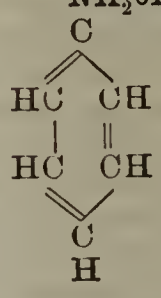
In *Thymol* there are three benzol hydrogens replaced, one by hydroxyl and the two others by the radicals methyl (CH_3) and propyl (C_3H_7). The constitution can therefore be represented as follows:—

Thymol ($C_{10}H_{14}O$)
Methylpropyloxybenzol.

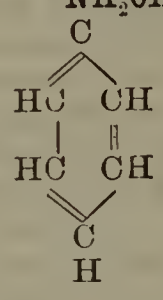


In *Antifebrin* we have a body which is formed when an atom of hydrogen of the amide (NH_2) in aniline (amidobenzol, $C_6H_5 \cdot NH_2$) is replaced by acetyl (CH_3CO). In the preparation of antifebrin aniline is boiled with glacial acetic acid in slight excess in a return condenser for two or three days, until the whole becomes solid on cooling, and the product, after removing unattacked aniline by melting and pouring it into water, is crystallized from alcohol. In the first stage of this process aniline acetate is formed, and this, on further application of heat under separation of water condenses to acetanilid, or antifebrin.

Aniline Acetate.

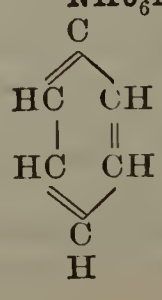


Antifebrin (C_8H_9NO).
Phenylacetamid or
Acetanilid.



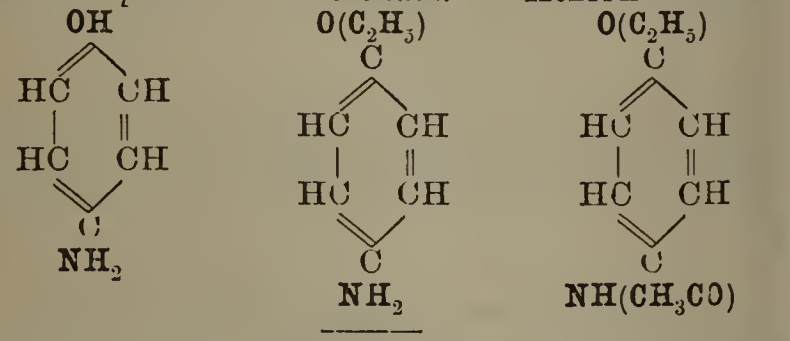
Analogous with this are the combinations of anilid with other acid radicals. Of these compounds it would appear that, at present, *benzanilid* has the best prospect of being introduced into medicine (*Berl. klin. Wochensch.*, 26–30). The preparation of benzanilid resembles that of acetanilid, and its formula is—

Benzanilid ($C_{13}H_{11}NO$).



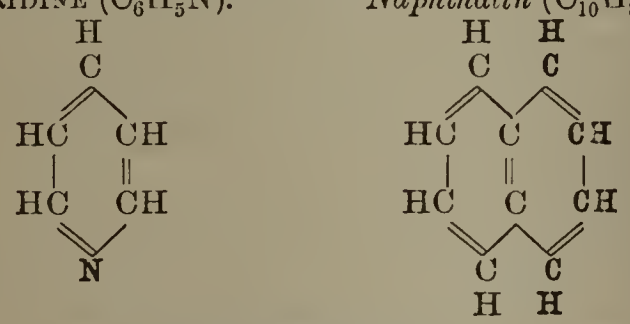
Acetphenetidin, a body similarly constituted to acetanilid, has also recently been recommended as an antipyretic. It is prepared by nitrating phenol, separating the ortho- and paranitrophenols formed, ethylizing the latter and reduction of the resulting p-nitroethylphenol, the product being the ethyl ether of paraamidophenol, or p-phenetidin. This by treatment with glacial acetic acid is converted into paraacetphenetidin.

Paraamidophenol. *Phenetidin.* ACETPHENETIDIN.

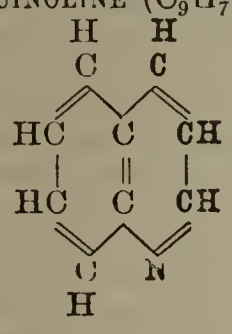


Another series of compounds mentioned are *Pyridine*, *Quinoline* and derivatives from quinoline, the connection of which with benzol may be shown through the formulæ of naphthalin and pyridine.

PYRIDINE (C_6H_5N). *Naphthalin* ($C_{10}H_8$).

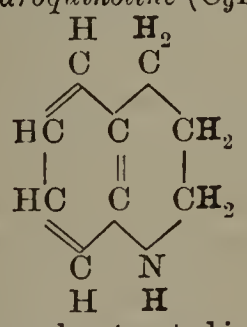


QUINOLINE (C_9H_7N).



Kairolin and *Kairin* are two bodies closely allied to quinoline and to each other; they are both hydrogenized quinolines (containing hydrogen added to CH and N groups), and contain also alkyl groups replacing hydrogen. The action of nascent hydrogen (tin and hydrochloric acid) upon quinoline gives rise to the formation, besides dihydroquinoline, of tetrahydroquinoline, which may be represented as follows, the variations from the quinoline formula being printed in thick type.

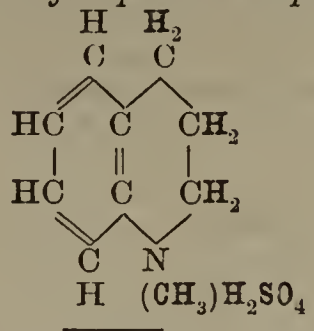
Tetrahydroquinoline ($C_9H_{11}N$).



Tetrahydroquinoline, when treated in the known manner with methyl iodide, yields a tertiary amine, a sulphate of which is known under the name *M-Kairolin.** Its systematic name is methyltetrahydroquinoline or methylquinolinetetrahydride, and the empirical formula of its sulphuric acid salt is $C_{10}H_{13}N \cdot H_2SO_4$. By the use of ethyl iodide the corresponding compound, *A-Kairolin*,* ethyltetrahydroquinoline ($C_{11}H_{15}N$) is obtained. The following represents the constitution of M-kairolin, the methyl compound, a C_2H_5 group taking the place of the CH_3 group in the formula for A-kairolin.

* The letters M and A are used by the manufacturers to distinguish the methyl and ethyl (aethyl) derivatives.

M-KAIROLIN ($C_{10}H_{13}N \cdot H_2SO_4$).
Methyltetrahydroquinolin Sulphate.



Whilst in the cases of the kairolins all the substitution is represented as taking place in the pyridine nucleus, in the formation of *Kairin* part of the substitution takes place in the pyridine and part in the benzol nucleus. Upon heating quinoline with fuming sulphuric acid 1-(ortho-)quinolinesulphonic acid is formed, which upon being fused with potash gives 1-oxyquinoline or ortho-oxyquinoline (C_9H_7NO). By the action of nascent hydrogen this is converted into 1-(ortho)tetrahydrooxyquinoline ($C_9H_{11}NO$), and from this, by treatment with methyl iodide, is obtained tetrahydromethyloxyquinoline, the hydrochlorate of which ($C_{10}H_{13}NO, . HCl + H_2O$) is the compound known as *M-kairin*. By the use of ethyl iodide the corresponding ethyl compound is formed, which is known as *A-kairin*, or *kairin*. The stages are represented by the following formulæ:—

1-*Oxy*(*ortho*)*quinoline* (C_9H_7NO). 1-(*Ortho*)*tetrahydrooxyquinoline* ($C_9H_{11}NO$).

M-KAIRIN ($C_{10}H_{13}NO_2 \cdot HCl + H_2O$) *Oxytetrahydromethylquinoline Hydrochlorate.*

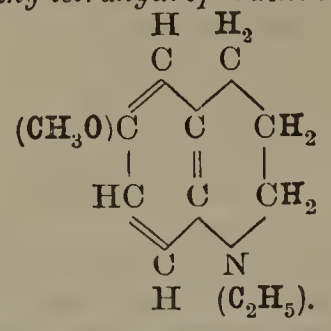
A-KAIRIN ($C_{11}H_{15}NO . HCl$) *Oxytetrahydroethylquinoline. Hydrochlorate.*

It has been shown by Skraup that chinoline can be formed synthetically by heating aniline (or aniline and nitrobenzol) with glycerine and sulphuric acid to a temperature of about 190° C. Homologues of chinoline can be prepared in a similar manner. When paraamidoanisol and paranitroanisol are heated with glycerine and sulphuric acid for some time at a temperature of from 140° to 150° C., parachinanisol ($C_{10}H_9NO$) is formed, which distils from an alkaline liquor in the vapour of water. By the action of nascent hydrogen this is converted into tetrahydroparachinanisol or *Thallin*.

Parachinanisol ($C_{10}H_9NO$). THALLIN ($C_{10}H_{13}NO$). *Tetrahydroparachinanisol.*

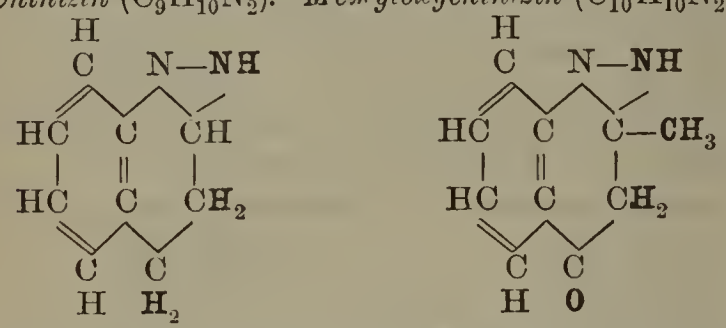
By heating thallin with ethyl iodide the ethyl group can be substituted for hydrogen, the product being ethyltetrahydroparachinanisol, or *Ethylthallin* ($C_{12}H_{17}NO$).

ETHYLTHALLIN ($C_{12}H_{17}NO$).
Ethyltetrahydroparachinanisol.



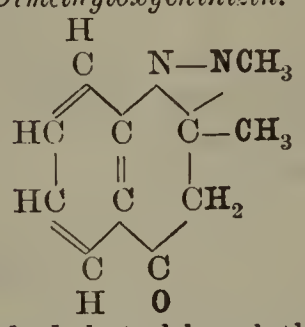
By the action of equal volumes of phenylhydrazin and acetoacetic ether upon one another, condensation takes place with elimination of water and alcohol and methyloxychinizin is formed. The hypothetical chinizin is interesting on account of the assumed combination in it of the two nitrogen atoms. Its relation with methyloxychinizin is illustrated by the following formulæ:—

Chinizin ($C_9H_{10}N_2$). *Methyloxychinizin* ($C_{10}H_{10}N_2O$).



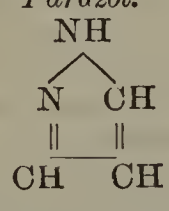
Upon heating methyloxychinizin with methyl iodide and methyl alcohol to a temperature of 100° C., the compound dimethyloxychinizin or oxydimethylchinizin, known better as *Antipyrin*, is formed.

ANTIPYRIN ($C_{11}H_{12}N_2O$).
Dimethyloxychinizin.

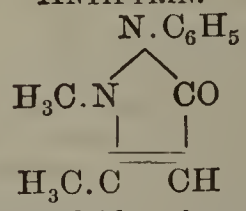


[It may be remarked that although this was the constitution first attributed to antipyrin, Dr. Knorr has since altered his views, and described it (*Annalen*, ccxxxviii. 137) as a "pyrazol" derivative. Parazol is represented as the type of a new class of bodies, and as standing in the same relation to pyrrol as pyridin to benzol. The relation between parazol and antipyrin is shown in the formulæ:—

Parazol.



ANTIPYRIN.

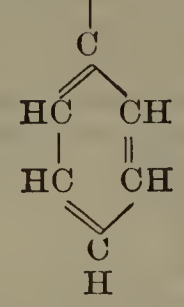


According to this view a tetrahydride of pyrazol is first formed, which is termed pyrazin, and next a CH_2 group is replaced by CO, the product being pyrazolon, and antipyrin is supposed to be a phenyldimethylpyrazolon.—ED. PH. J.]

Another compound which has been credited with antipyretic properties is phenylhydrazinlevulinic acid or *Antithermin*. It is formed as a yellow precipitate upon bringing together phenylhydrazin and levulinic acid in acetic acid solution, condensation taking place with the elimination of the elements of water. Levulinic acid may be considered as acetylpropionic acid—

$CH_3CO.CH_2.CH_2.COOH$.

ANTITHERMIN.
Phenylhydrazinlevulinic Acid.



Further information respecting most of the foregoing compounds will be found in a paper by Mr. T. S. Dymond, at p. 895.

ESTIMATION OF ALKALOIDS IN NARCOTIC EXTRACTS.*

BY EUGEN DIETERICH.

The examination of all extracts regarding their value is obviously a necessity, and in the case of narcotic extracts is sure to be satisfactory, because we are dealing with fixed and known chemical compounds, namely, the alkaloids. A narcotic extract to be normal must contain a certain quantity of alkaloid, and should it contain a smaller quantity, be it caused by careless preparation or sophistication, it must be rejected.

The requirements which the present German Pharmacopœia exacts (description of the colour and formation of limpid or turbid solution) are evidently unsatisfactory, and demand a decided correction, considering the importance of such medicaments as the narcotic extracts. Recent publications by Kunz and Schweissinger and also Leuken, who merely gave reactions for their identity, have stimulated a desire for further research. With a view of making the examination of narcotic extracts also a subject for study, Dieterich makes a critical comparison, and gives figures after trying all known methods. He obtained from extracts of belladonna, aconite, digitalis and hyoscyamus all the reactions mentioned by Leuken; but the differences in colour between violet and raspberry red and the differences between heavier and lighter precipitation and colour (difference between belladonna and hyoscyamus) are not so great as to allow one with limited experience to come to any positive conclusions. Schweissinger's assertion that unsophisticated extract of belladonna does not reduce Fehling's solution has not been confirmed, and has since been retracted by him.

Schweissinger's method for determining the alkaloid in aconite, belladonna, hyoscyamus and nux vomica by gravimetric analysis was successful, and the author's figures closely correspond with those given by the former.

Instead of treating the extract with dilute sulphuric acid, adding ammonia and shaking with chloroform, Kunz exhausted with alcohol, evaporated, then made alkaline and treated with ether, and, lastly, with chloroform. By evaporating the ether and chloroform solutions the alkaloid was obtained and subjected to further purification. By this method he undoubtedly obtained a pure alkaloid; but it must be taken into consideration that he operated with 50 grams of extract. Schweissinger found that the chloroform would not emulsionize so readily with the alkaline solution of the extract, and went a step further in not only determining the alkaloid gravimetrically, but also volumetrically. Dieterich followed Schweissinger's method, and the alkaloid obtained by evaporating the chloroformic solution corresponded in weight with that found by Schweissinger, but did not correspond with the figures obtained by titration, as the following table shows:—

* Translated and abridged from *Pharm. Centralhalle*. Reprinted from the *American Journal of Pharmacy*.

Extract of Belladonna.

	By weight.	By titration.
1.	1·060 per cent. alkaloid.	0·070 per cent. alkaloid.
2.	1·020 „ „	0·116 „ „
3.	1·320 „ „	0·335 „ „
4.	1·480 „ „	0·138 „ „
5.	1·445 „ „	0·046 „ „
6.	1·313 „ „	0·470 „ „

Extract of Hyoscyamus.

7.	0·572 per cent. alkaloid	0·058 per cent. alkaloid.
8.	0·710 „ „	0·116 „ „

It is evident that by titration a smaller quantity is obtained than by weighing, but the difference is so great that it cannot be attributed to impurity of the alkaloid. 0·04 gram of pure atropine required 13·6 c.c. of 100th normal acid, which is equal to 0 0393 atropine.

A strong penetrating odour and white fumes were noticed coming from the chloroform solution whilst evaporating on a water-bath, and recalling the fact that chloroform vapour at a red heat is decomposed yielding carbon, chlorine and hydrogen chloride, decomposition was supposed to be due to the flame under the water-bath. Part of the chlorine compound was found in the alkaloidal residue by the following experiments :—A piece of moistened blue litmus paper was placed over the flame whilst the chloroform was being evaporated, and reddening of the paper was soon observed. A small quantity of chloroform was placed alongside of some ammonia in a covered flat glass vessel, and immediately on placing a lighted spirit-lamp under the chloroform white fumes of ammonium chloride were noticed, and in a very short time the ammonia solution after acidulating with nitric acid gave a strong chlorine reaction with silver nitrate. Undoubtedly a portion of the alkaloid combines with the acid thus liberated and is lost for titration.

It being desirable to control the gravimetric analysis by titration, another solvent—ether—was used with satisfactory results. Slight differences were noticed in the yield of alkaloid, but by repeatedly shaking with ether a larger yield was obtained ; it is, however, doubtful if all the alkaloid can thus be extracted, and as a result of his experiments Dieterich comes to the conclusion that it is impossible to completely exhaust such organic substances by shaking or precipitation. Very satisfactory results were obtained by displacement. To accomplish this the extract was treated with an alkali, the mixture made porous and then exhausted with ether. To liberate the alkaloids lime, baryta and ammonia were used, and for porous substances lime and washed powdered pumice stone. After making sure that the lime (in the form of burnt marble) did not decompose atropine, hyoscyamine, strychnine, brucine, etc., the quantity of water most suitable for the purpose remained to be ascertained. The extract was dissolved in water and mixed with lime and pumice stone and exhausted by continuous displacement (the apparatus used is described in *Phar. Centralhalle*, 1886, p. 273) with ether, a water-bath supplying the requisite warmth. The ethereal solution was evaporated to about 1 c.c., several drops of alcohol and 10 c.c. of water were added, and the solution was titrated with 100th normal acid, using rosolic acid as an indicator. The results were as follows :—

	Extr. Bellad.	Water.	Lime.	Pumice.	Alkaloid.
9.	1 gm.	1 gm.	2 5 gm.	10 gm.	·665 p.c.
10.	2 „	2 „	5 „	10 „	·838 „
11.	2 „	1 „	5 „	10 „	·925 „
12.	1 „	2 „	5 „	5 „	·982 „
13.	2 „	2 „	5 „	5 „	1·040 „
14.	2 „	2 „	5 „	10 „	1·040 „
15.	2 „	3 „	10 „	5 „	1·128 „
16.	2 „	2 „	10 „	— „	1·069 „
17.	2 „	3 „	10 „	— „	1·180 „

The largest yield was obtained with a large excess of lime (No. 17). Less favourable were the following experiments :—

(18) Two extract bellad., 2 ammonia, 15 pumice; 1·156 per cent. alkaloid.

(19) Two extract bellad., 2 water, 1 baryta, 15 pumice; 1·127 per cent. alkaloid.

Ammonia takes up a great deal of colouring matter and renders titration difficult, and the same, but in a less degree, is the case with baryta. Before giving a definite method experiments were made to determine whether there is any decomposition of the alkaloid, and secondly, whether the alkaloid may be completely removed from the extract treated with lime. Accordingly 10·0 grams of extract of belladonna were dissolved in 15·0 grams of water, 50·0 lime added and treated for half an hour with ether. The 100 c.c. of alkaloid solution thus obtained was divided into five portions of 20 c.c. each, and a few drops of alcohol and water were added in experiment 21, when reduced to about 1 c c.

	20 c.c. evaporated	Dried at	Percentage of Alkaloid. Weight.	Titration.
20.	Spontaneously	40° C.	1·322	1·165
21.	Water-bath	—	1·315	1·159
22.	„	60° C. for 15′	1·222	1·045
23.	„	100° C. for 10′	1·117	0·627
24.	„	100° C. for 15′	1·110	0·569

Experiments No. 20 and No. 21 can be taken as normal, whilst from No. 22 to No. 24 according to temperature and time used in drying a considerable discrepancy in the figures attained by titration is noticeable. The question arises if by drying the alkaloid there is a decomposition, or if the dried alkaloid is not so readily affected by the acid. Solutions No. 23 and No. 24 were allowed to stand one day and again examined. The solutions were neutral just as on the previous day ; if it were due to difficult solubility, they should have reacted alkaline and required the addition of more acid. A decomposition, it must be inferred, takes place. Experiments No. 20 and No. 21 show in weighed (crude) and titrated (pure) alkaloid a ratio of 100 : 88.

(25) To determine whether ether is quick or slow to dissolve out the alkaloid, 2·0 extra of belladonna were dissolved in 3·0 water and mixed with 10·0 lime. The powder was displaced with five portions of ether. Each portion was collected and examined separately with the following results :—

I.	0 968 per cent.
II.	0·072 „
III.	0·072 „
IV.	0 057 „
V.	traces
Total	1·169 p. c. of alkaloid.

Hence it must be concluded that ether answers for completely extracting the alkaloid.

(26) Two gm. extr. belladonna dissolved in 3·0 water, added 0·040 atropine and 10·0 lime, extracted with ether and carefully evaporated to about 1 c.c., added a few drops of alcohol and 10 c.c. of water. It required for titration 21·7 c.c. 100th normal acid. After deducting 13·6 c.c. for the 0·04 atropine added, the remaining 8·1 c.c. indicate 1·170 per cent. of alkaloid. The result thus obtained must be considered satisfactory, and shows that lime does not decompose the alkaloid.

(27) 0·024 gram of atropine dissolved in 3 c.c. of water, added 10 0 powdered lime, exhausted with ether, evaporated and dissolved the residue in a few drops of alcohol and 10 c.c. of water; required for neutralization 8·1 c.c. 100th normal acid corresponding to 0·0234 atropine. The loss sustained is very small, and proves beyond doubt that displacement is preferable to shaking.

So far the experiments were made only with extract of belladonna, and although good results were obtained it was concluded to examine the extracts of aconite, conium and hyoscyamus, and to use—firstly, the ordinary method with lime ; secondly, with lime and fractional displacement ; and thirdly, the ammonia process. The following shows the yield in alkaloids :—

	Extract.	First method. Per cent.	Second method. Per cent.	Third method. Per cent.
28–30.	Aconite	1·279	1·299	1·305
31–33.	Conium	0·635	0 618	0 647
34–36.	Hyoscyamus	0·837	0·837	0·803

Whilst the extraction of extract of aconite and extract of hyoscyamus is easily accomplished in half an hour, it required from one and a half to two hours to completely exhaust the conium extract. The figures obtained prove the efficacy of the new process. The only doubt was in reference to extract of nux vomica, as some text books give the solubility of strychnine in ether to be 1 : 1250, and brucine as insoluble. To ascertain their solubility in ether, 0·1 strychnine and 0·1 brucine were triturated with 3·0 c.c. of water and 10·0 of lime. After extracting the powder with ether for one hour, the liquid was evaporated and dissolved in a few drops of alcohol and 10 c.c. of distilled water; for titration 7·5 c.c. 100th normal acid were required, equivalent to 0·1365 alkaloid In the meantime the extraction was carried on for another hour. The liquid treated as before required for titration 3·1 c.c. 100th normal acid equivalent to 0·0564 alkaloid, making the total 0·1929. This experiment proves conclusively that brucine is not insoluble in ether, and it naturally follows that the amorphous alkaloid, as obtained by the action of the alkalies, must be more soluble than the pure alkaloid.

It was necessary to slightly modify the process for extract of nux vomica owing to the large amount of alkaloid it contains. The same quantity of water and only half the quantity of extract, rosolic acid as indicator and 20th normal acid, in place of 100th normal acid, were used; assuming the presence of equal quantities of brucine and strychnine, 1 c.c. of 20th normal sulphuric acid is equivalent to 0·0182 gram of alkaloid.

The experiments were made as with extract of belladonna, with the following results :—

(38 and 39) 1·0 extract nux vomica, 3·0 water and 10·0 lime yielded 18·92 p.c. and 18·74 p.c. alkaloid.

(40) 1·0 extract nux vomica, 3·0 water, 10·0 lime were treated three times with cold ether and then displaced, the four fractions yielded 15·10, 2·36 and 0·92, or a total of 18·74 per cent. alkaloid.

(41) 1·0 extract nux vomica, 1·0 water, 2·0 ammonia and 15·0 pumice stone, after one hour's extraction 18·38 per cent., after fifteen minutes more 0·18 per cent., total 18·56 per cent. of alkaloid.

(42) 1·0 extract nux vomica, 0·1 strychnine, 0·1 brucine, 3·0 water, five drops diluted sulphuric acid, 10·0 lime yield 18·74 per cent. of alkaloid after deducting the strychnine and brucine added.

Experiments No 38 to 42 furnish proof that both lime and ammonia answer for the modified process. Whilst titrating it was noticed that toward the end the reactions were not so distinct as with the other extracts, so that very sensitive test-paper had to be employed; furthermore crystals of alkaloids separated out in the ethereal solution and had to be redissolved in alcohol. Lime, therefore, again proved preferable to ammonia.

The above results indicate that the method is well adapted for estimating the amount of alkaloid contained in the extract, but it requires exact work, and, above all, a complete liberation and solution of the alkaloids.

To determine whether the addition of lime, owing to its great affinity for water, would prevent the complete exhaustion of the extract, the extract was dissolved in normal ammonia and mixed with lime, so that the alkaloids were liberated by the ammonia, while the lime merely took up moisture and colouring matter, and by uniform incorporation with the extract rendered it fit for extraction. The following experiments show the results obtained :—

(43) Twenty gm. extract aconite, 2 c.c. normal ammonia, 10 gm. powdered lime, yield 1·279 per cent. alkaloid (compare experiments 28, 29, 30).

(44) Two gm. extract belladonna, 2 c.c. normal ammonia, 10 gm. powdered lime, yield 1·156 per cent. alkaloid (compare experiments 17, 18, 20, 21, 25).

(45) Two gm. extract hyoscyamus, 2 c.c. normal ammonia, 10 gm. powdered lime, yield 0 766 per cent. alkaloid (compare experiments 34, 35, 36).

(46) One gm. extract nux vomica, 2 c.c. normal ammonia, 10 gm. powdered lime, yield 18 74 per cent. alkaloid (compare experiments 38 to 42).

By comparison it will be observed that the same quantities were obtained as before, proving that either ammonia or lime, or both, may be used. The slight difference in extract of hyoscyamus is due to the fact that a new sample of extract was used. The process practically consists in, firstly, liberation of the alkaloid; secondly, extraction with ether; thirdly, evaporation of the ethereal solution; and fourthly, titration. Of these the third requires a great deal of attention.

(*a*) *Examination of Extracts of Belladonna, Aconite, Conium and Hyoscyamus.*—Triturate 0·2 gram of powdered lime, prepared from marble, with 3 gm. of water, add 2 gm. of extract, when dissolved carefully add 10 gm. powdered lime. The mixture is then placed in a closed continuous displacement apparatus, the receiving bottle containing about 30 gm. of ether is suspended over a water-bath (not too hot) and the process of extraction is regulated by bringing the ether bottle nearer or further from the water-bath. With extracts of belladonna, aconite and hyoscyamus extraction is carried on for thirty or forty-five minutes at the highest. Conium extract requires at least two hours. It is advisable to exhaust a second time with ether. The ethereal solution of the alkaloids is transferred to a tared porcelain capsule, and the receiving bottle rinsed two or three times with small portions of ether; 1 c.c. of distilled water is added, and the ether carefully evaporated over a water-bath at a temperature not exceeding 30° C., care being taken not to work near hydrochloric, nitric, acetic or other volatile acid. The residue weighing 1 5 grams is dissolved in 0·5 c.c. of alcohol, specific gravity 892, the solution diluted with 10 c.c. distilled water, and after adding one or two drops of rosolic acid solution (1 : 100 alcohol) titrated with 100th normal sulphuric acid, each cubic centimetre of which neutralizes 0·00289 gm. atropine or hyoscyamine, 0·00523 gm. aconitine, and 0·00127 conine. The following results were obtained :—

Extract of Belladonna (thirteen experiments) 1·170, 1·184, 1·163, 1·170, 1·156, 1·142, 1·156, 1·142, 1·156, 1·170, 1·184, 1·170, 1·170 per cent.

Extract of Aconite Root (six experiments) 1·305, 1·252, 1·279, 1·252, 1·279, 1·279 per cent.

Extract of Hyoscyamus (six experiments) ·780, ·766, ·766 ·751, ·751, ·766 per cent.

Extract of Conium (six experiments) ·609, ·597, ·622, ·622, ·597, ·589, per cent.

(*β*) *Examination of Extract of Nux Vomica.*—0·2 gm. powdered lime and 1 gm. extract of nux vomica are intimately mixed, 3 c.c. of distilled water added and evenly mixed with 10 gm. powdered lime, then exhausted in the same manner as before for one and a half or one and three quarter hours. The receiving bottle is rinsed with alcohol twice and then with ether, and after adding 1 c.c. of distilled water the percolate is evaporated in a tared porcelain capsule (at the same temperature and with the same caution as stated above) to 1 5 grams; then add 0·5 c.c. alcohol specific gravity ·892, 10 c.c. of distilled water and two drops of rosolic acid solution and titrate with 1-20th normal sulphuric acid. Toward the end it is advisable to use delicate blue litmus-paper, conveying the solution on the paper by means of platinum wire; 1 c.c. of 1-20th normal sulphuric acid corresponds to 0·0182 gram of alkaloid.

The method may be modified by triturating 1 gm. extract nux vomica with 3 c.c. normal ammonia and adding 10 gm. powdered lime. The first process yielded the following results of six experiments :—18·74, 18·92, 18·74, 18·56, 18·65 per cent. alkaloid.

The Pharmaceutical Journal.

SATURDAY, APRIL 30, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE PHARMACY ACTS AMENDMENT BILL.

SINCE the adjournment of the debate on the Pharmacy Acts Amendment Bill on the 5th inst., as reported in this Journal of the 9th inst., no further progress has been made with the measure in Parliament, but several notices of motion have been given which will have the effect of preventing its being dealt with, unless it comes on for consideration before half-past twelve o'clock. This process of opposition, which is technically termed "blocking," has been adopted by Mr. HERMON HODGE, the member for Accrington, by Mr. GENT-DAVIS, the member for Lambeth, and by Mr. PICTON, the member for Leicester. In addition, notices of amendments to be moved have been given by Mr. ELLIS, the member for Leicestershire, and by Colonel DUNCAN. The latter proposes to make the power of prescribing courses of instruction in chemistry, botany, and materia medica, and of approving the schools where such instruction shall be given, subject to approval by the Privy Council, and his motion of amendment will be to insert words to that effect in the second clause of the Bill. Mr. ELLIS'S amendment goes much further, and is aimed at doing away altogether with the attendance of the courses of instruction which are considered to be essential for ensuring adequate pharmaceutical education, so that by the proposal to eliminate from Clause 1 of the Bill the words stating that the powers of the Pharmacy Acts shall be extended in that respect, the chief object for which the Bill has been introduced would be defeated. Another amendment proposed by Mr. ELLIS is conceived in the interest of public hospitals or dispensaries, and is intended to make such establishments equivalent to the open shops of chemists and druggists, as places in which candidates for pharmaceutical qualification must have served for not less than three years in the capacity of apprentices or pupils. These last-mentioned amendments are so thoroughly inconsistent with the possibility of developing a system of pharmaceutical education that would be beneficial either to future chemists and druggists or to the public, that it can scarcely be expected they will meet with much favour when they come to be discussed in Parliament. If there be any condition under which the practice of pharmacy is conducted so imperfectly as to offer no opportunity for acquiring proficiency in the art it is in the "dispensary," as it is generally met with, and even in public hospitals, dispensing, the only part of pharmacy that is practised there to any extent, is not frequently carried out in such a manner as would be satisfactory to the outside public. Colonel DUNCAN'S amendment is, however, of a reasonable nature, inasmuch as it aims at providing a means by which interests outside those of the pharmaceutical community may be duly safeguarded, and any tendency to undue demands upon students counteracted. This amendment is not in any way a hostile one, but those of which Mr. ELLIS has given notice strike at the very root of the Bill, and are in direct antagonism to the objects with which the Bill has been brought into Parliament.

It is under present conditions very uncertain when the Bill may come on for discussion. Last Monday it was down on the orders of the day for going into Committee, but as it stood far down in the list it was not reached by the time the House rose, and in fact there had been little probability of any other result. Meanwhile, however, a certain amount of opposition to the Bill has been brought into prominence by the distribution among members of Parliament of circulars which are evidently intended to influence them unfavourably to the objects of the Pharmaceutical Society. The arguments contained in one of these circulars are sufficiently replied to by Mr. SCHACHT in a letter that appears on p. 900. It is not apparent what source these circulars emanate from, for they are anonymous, and it is only from their tenour that it might be conjectured that they have been issued in the interest of the class of "grinders" brought into existence by the Pharmacy Act of 1868, and enabled through its defects to drive a lucrative trade in "preparing" candidates for examination. Certainly, it cannot be imagined that any establishments designed for imparting sound pharmaceutical training could have adopted such a mode of opposing the Bill, because the interests of such establishments could not be otherwise than benefited by the support which the passing of the Bill would render to them. But the case would be different with the grinders who have within the past ten years become the substitutes for true teachers and trainers in pharmacy. The establishment of a thorough system of pharmaceutical education may well be expected to put an end to that state of things under which candidates present themselves unsuccessfully four or five or six times, and even oftener, for the examination they have to pass in order to obtain qualification to keep a chemist and druggist's shop. These rejected candidates, amounting to more than one-half of the total number, go back again to the grinder, and form a perennial supply of grist to his mill. This is the real evil in regard to phar-

maceutical education, an evil that cannot be remedied so long as the mere passing of an examination is the only thing compulsory, and it is to remedy this evil that the Bill now before Parliament has been introduced with the object of carrying out the chief purpose for which the Pharmaceutical Society has laboured for upwards of forty years since its foundation. The late reports of Dr. GREENHOW, the Government Visitor of Examinations, contain references to the defective technical training and early education of greater part of the candidates presenting themselves for examination, which leave no doubt as to the magnitude of the evil that now exists, and though his particular business is to see that the examination is conducted in such a manner as to afford a sufficient test of competency in those who pass, the fact of his repeated reference to the large proportion of candidates who are incompetent to satisfy that test, furnishes the strongest evidence of the need for measures which will have the effect of compelling the candidates to become better educated and trained.

In the circular above mentioned as having been sent to members of Parliament to induce them to oppose the Bill, numerous quotations are given from Dr. GREENHOW'S reports extending over a period of eighteen years; but these quotations refer only to the opinion he holds as to the sufficiency of the examination as a guarantee that those who pass it are competent to carry on the business of a chemist and druggist. His testimony in this respect may be taken as sufficient evidence that the Pharmaceutical Society has, through its Examining Board, beneficially performed its duties in the public interest; but it does not constitute any argument against the necessity for further means of dealing with those candidates who cannot satisfy the requirements of the Examining Board. It has indeed nothing to do with that matter nor with the objects for which the Bill now in Parliament has been brought forward by the Society. However much it may be regarded as certain that those who pass the examination possess that competent practical knowledge of their business which it was the intention of the Pharmacy Acts to ensure, it is not the less certain that a very large proportion of those who present themselves to qualify under that Act, after having been for at least three years engaged in the business as apprentices or pupils, are found to be unable to pass the examination, and we have Dr. GREENHOW'S authority for stating that there is no other cause for their failure than incompetence. It is to this aspect of the case that the attention of the Council has been directed in framing the Bill by which it is now sought to obtain powers for the Society to establish a system of pharmaceutical examination. It is in the interest of those candidates who fail that these powers are now sought for, by which they can be compelled in future to go through a course of training that will enable them to satisfy the test of qualification. It is argued that since the Pharmaceutical Society has a school of its own, that it is with an interested motive that these powers are sought for; but that is not the case, for though the School has been maintained since the foundation of the Society, it has not been as a source of profit that this has been done. Throughout, the School has been supported only by continual contribution from the Society's funds, and solely with the object of stimulating pharmaceutical education. The assistance that has been rendered by the Society to provincial schools ought also to show that there is no desire to obstruct the supply of educational opportunities of a satisfactory character, and as regards the contention that the extension of powers now sought for by the Society would entail additional expense upon pharmaceutical students, it may with far greater reason be answered that any expense thus occasioned would be light in comparison with that attending repeated failures in examination, and consequent repeated recourse to the devices so inadequate to supply the want of systematic training and education.

It will be seen from a notice on the front page of the Journal, that the time for the examinations for the Jacob Bell Memorial Scholarships is now approaching, and that intending candidates must send notice of their desire to compete for them on or before the first day of June next. Two scholarships are offered of the value of thirty pounds, to be held for one year, and the Council provides in addition for laboratory instruction with admission to the lectures to the holders of the scholarships.

* * *

We have been requested to notice that Professor Bentley's lectures and demonstrations on Systematic and Practical Botany, at the Gardens of the Royal Botanic Society, Regent's Park, will commence on Saturday, May 7, at half-past eight o'clock in the morning.

* * *

We notice with pleasure that Mr. A. F. Pollard, second son of Mr. H. H. Pollard, Local Secretary to the Pharmaceutical Society at Ryde, has been elected to an open Classical Exhibition at Jesus College, Oxford.

* * *

At the next meeting of the Chemical Society, on Thursday, May 5, the papers to be read are "A Contribution to the Study of Well Waters," by R. Warington; "The Distribution of Lead in the Brains of Two Lead Factory Operatives, dying suddenly," by A. W. Blyth; and "Crystals in Basic Converter Slag," by J. E. Stead and C. H. Ridsdale.

* * *

The Annual General Meeting of the Chemists' Assistants' Association will be held on Wednesday, May 4, at 9 p.m., to receive the annual report and elect the new Council.

* * *

The next meeting of the School of Pharmacy Students' Asssociation will take place on Thursday, May 5, when a paper will be read on "A Method of Estimating Nitrates" by Miss M. E. Buchanan; and a "Report on Botany" by Mr. E. G. Baker.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

At a meeting of the Board of Examiners for England and Wales, held on Thursday, April 28, the report of the College of Preceptors on the examinations held on April 12 was received.

Four hundred and twenty candidates had presented themselves for examination, of whom *one hundred and ninety-eight* had failed. The following *two hundred and twenty-two* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students :—

Akam, Arthur .....Bradford.
Attenburrow, James .....Eastbourne.
Ballantyne, William .....Glasgow.
Bean, Percy .....Blackburn.
Beattie, Frederick .....Portobello.
Bell, William .....Southampton.
Bellamy, Archibald John .....Cardiff.
Belton, Walter Henry..... .....London.
Bennison, George.....Whitby.
Benson, Arthur Herbert.....Wigan.
Besting, George Edward.....Tunstall.
Bilby, Frederic Wm. Collins ...Kidderminster.
Birt, Charles... .....Birmingham.
Blamey, John .....Penryn.
Bolwell, Albert George .....Bath.
Bonser, John Henry .....Derby.
Bowen, Isaac.....Llangammarch.
Brewis, Edward James .....Newcastle-on-Tyne.
Broad, Wm. Thos. Dane .....Bath.
Broom, Frank Willey ....Exeter.
Brown, Herbert .....Carrington.
Brown, John Arthur .....Leicester.
Brown, Sidney .....Southmolton.
Brown, William Arthur .....Ashbourne.
Buckle, John William.....Easingwold.
Bushby, George Frederick .....Manchester.
Calvert, William David .....Barnsley.
Carnegie, Robert .....Peterhead.
Chalmers, James .....Broughty Ferry.
Chapman, John .....Southwell.
Cheatle, Charles Edwd. Garne..Cheltenham.
Clark, Percival Turton .....Stoke Ferry.
Clow, David ....Kelso.
Coleman, John David .....Cardiff.
Collier, Henry William .....Laudon.
Conley, Thomas .....Edinburgh.
Connan, Campbell .....Crieff.
Cowles, Hector Charles .....London.
Craig, Henry Riddell ....Biggar.
Crossley, Richard:.....Earlestown.
Cundall, Thomas Bowser .....Pocklington.
Currie, James Charles.....Stirling.
Dale, John Graves .....Stockton-on-Tees.
David, David Joseph .....Cowbridge.
Davies, David Evans .....Pontypridd.
Davies, David John.....Swansea.
Davies, John.. .....Torquay.
Davies, Thomas ....Aberystwith.
Davies, William .....Lampeter.
Davies, William Henry .....Cardigan.
Dennis, Ernest E. Gascoigne...Louth.
Dinwoodie, John Alexander ...Stranraer.
Dobbins, William Merry .....Redditch.
Duckworth, Daniel .....Blackburn.
Dunning, James .....Manchester.
Edgar, Alexander.....Denny.
Edgar, John James..... .....Daventry.
Edwards, Henry Charles .....Rye.
Elliott, Smith .....Oswaldkirk.
Ellis, John Alfred .....Wisbech.
Fagan, Albert Ed. Thorsby ...Scarborough.
Farmer, Thomas .....Bridgnorth.
Field, Sam..... .....Worksop.
Fisher, Richard Gibson .....Hornsea.
Ford, Jessie ....Denhead.
Frith, John Benjamin... .....Coggeshall.
Furness, Ernest Walter .....Atherstone.
Gard, John .....Camelford.
Gilbert, Arthur Stanley .....Camborne.
Glover, Alfred Augustus.....Bedford.
Glover, John.....St. Helens.
Gower, John.....Carmarthen.
Greaves, Henry Eldred .....Ironville.
Green. George Edward .....Sevenoaks.
Griffiths, John Herbert .....Little Brighton.
Griffiths, William Ewart.....Tonbridge.
Guy, Fredk. Jno. Vavasour ...Uppingham.
Hall, Charles Albert .....Peterborough.
Halliday, Herbert .....Skipton.
Halstead, Reginald Gordon ...Leeds.
Hampton, Peter .....Arbroath.
Hannah, Henry .....Paisley.
Hardy, George Bonner .....Parkstone.
Hattersley, Sydney Herbert ...Conisborough.
Healey, Harold St. George.....Taunton.
Hendry, Alexander John .....Turriff.
Hill, Leonard Vincent .....Sheffield.
Holoran, Frank George .....Retford.
Hoare, William Harold .....Derby.
Honeyman, Edmund .....Newcastle-on-Tyne.
Huckle, Arthur Hy. Headley London.
Hunter, Robert .....Glasgow.
Hyne, Henry .....Landport.
Jackson, George .....Leeds.
Jackson, Thomas.....Preston.
James, James Richard .....London.
James, Thomas.....Llandyssil.
Jennings, Hy. Geo. Herbert ...Bulwell.
Jones, Arthur Alderson .....Liverpool.
Jones, Driver Fitzherbert .....Devizes.
Jones, Henry Rees .....Aberystwith.
Kay, Arthur Charles .....Glossop.
Kaye, Alexander.....Perth.
Killoh, Alexander .....Aberdeen.
Kissell, John Victor .....St. Mewan.
La Fontaine, Edwin William...Newark.
Lander, Arthur ....St. Keyne.
Lankford, Frederick James ...Westbury-on-Trym.
Law, Joseph.....Rochdale.
Laybourne, Robert George.....Grantham.
Liley, Geerge Cobden.....Drighlington.
Litherland, William Heald.....Wigan.
Longman, Samuel Hurman ...Wincanton.
Loosmore, Edward James .....Swansea.
McClumpha, Robert .....Newcastle-on-Tyne.
Macdonald, Reginald Edwd. ...Edinburgh.
McKinlay, John Robert.....London.
MacLennan, George .....Nairn.
McNeill, William.....Currie.
McRae, John .....Fochabers.
Marlor, Thomas .....Oldham.
Marples, Joseph Henry .....Birkenhead.
Martin, George Hymers .....Gateshead-on-Tyne.
Mason, Joseph .....Sheffield.
Masters, Frederick Miller .....London.
Melrose, William .....Greenock.
Milne, James .....Aberdeen.
Minifie, Cyril Conrad .....Sherborne.
Mitchell, William.....Hyde.
Mitten, Bessie Jordan.....Hurstpierpoint.
Montgomery, Colin Campbell...Rutherglen.
Morcombe, Joseph .....Pembroke Dock.
Morgan, Alfred.....Market Drayton.
Morley, Sydney Edwin .....Portsmouth.
Moss, Ernest Robert .....Mansfield.
Munro, William Alexander.....Hawick.

Murray, Alexander .....Edinburgh.
Murray, Alexander .....Stirling.
Napper, Alfred Herbert .....Manchester.
Newell, Charles Samuel .....Carlisle.
Newton, Robert .....Edinburgh.
Osborne, William John .....Louth.
Parker, John Robert .....York.
Parry, Owen .....Cardigan.
Paterson, James Alexander ...Edinburgh.
Pattison, Thomas Dowson .....West Hartlepool.
Pearson, George Bruce .....Great Yarmouth.
Pirie, James M.....New Deer.
Platt, Robert.....Chester.
Porritt, Frederick William.....North Ormesby.
Pritchard, John .....Brynmawr.
Priestman, Abraham .....Barrow-in-Furness.
Punch, James .....Sedbergh.
Reed, Joseph.....Dumfries.
Rees, Thomas John .....Pentrechwyth.
Rees, William Edward .....Llanidloes.
Rees, William Hy. Philipps ...Haverfordwest.
Rhodes Albert Arthur .....Brigg.
Richards, Ralph Conrad.....London.
Roberts, Herbert Charles .....Leicester.
Robson, Tom Wardhaugh .....London.
Ross, John Alexander.....Forres.
Rotherham, Frank Herbert ...Birmingham.
Royle, James .....Wilmslow.
Salmon, Thomas William .....Stockton-on-Tees.
Sanderson, George Alfred .....York.
Sanford, Joseph Michael.....Exeter.
Satterthwaite, Robert.....Lancaster.
Sarjeant, Alfred .....Ramsey.
Sawden, Harry Edward .....Liverpool.
Scott, Henry.....Keswick.
Searle, George Alexander .....Guernsey.
Shankland, David .....Govan.
Shaw, George Arthur .....Stockport.
Simpson. Stewart Richard .....Llandilo.
Sinclair, Robert.....Dunfermline.
Smith, Henry .....Elgin.
Smith, Herbert Thomas .....Leeds.
Smith, John Henry.....Morecambe.
Smith, Rowland .....Chesterfield.
Smith, Walter .....Reading.
Smith, Walter .....Fyvie.
Spark, William.....Maryport.
Spencer, George Herbert .....Bawtry.
Steggles, George .....Petworth.
Stewart, Peter Alexander .....Hamilton.
Stratford, Horace Oliver.....Margate.
Swindells, Richard .....Hyde.
Sylvester, Ernest Jno. Arthur..Southsea.
Symington, James Martin..... Maryport.
Taylor, Frederick William .....Blackburn.
Taylor, James .....Eccles.
Taylor, Walter.....Gainsborough.
Thirkell, John .....London.
Thomas, Frank Robert ... .London.
Thomas, Thomas .....Llanelly.
Thorp, Alfred Wild.....Gildersome.
Tiffany, John William .....Halifax.
Tiltman, William.....Launceston.
Toohig, Albert William .....Narberth.
Troupe, George Robert .. ..Middlesborough.
Tully, Alexander Bell.....Kelso.
Turner, Charles Getting .....Shirley.
Twelves, Charles Henry .....Whittington Moor.
Tyler, William Harry .....Ashby de la Zouch.
Wallace, Mungo .....Glasgow.
Walters, Frank Wright .....Pentrich.
Ware, Alan Henry .....Exeter.
Warhurst, William Herbert .. Liverpool.
Welch, Geo. Richard Julians...Bradford-on-Avon.
Weston, Charles Edward .....Newquay.
Westrup, John Spencer .....London.
White, Challen.....Launceston.
White, Thomas Randal .....Durham.
Wilkie, Herbert Farnington ...Duns.
Wilkinson, Arthur Molyneaux .London.
Wilkinson, William Franklin...Blackpool.
Willey, Thomas Charles .....Louth.
Wilson, William .....Walthamstow.
Woodcock, Herbert Hy. Addis.Margate.
Wright, George Burkitt .....Doncaster.
Young, Archibald John .....South Queensferry.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	8	6	2	Lancaster	11	5	6
Birmingham	20	7	13	Leeds	12	8	4
Brighton	7	1	6	Lincoln	8	6	2
Bristol	14	7	7	Liverpool	18	9	9
Cambridge	4	1	3	London	37	20	17
Canterbury	5	3	2	Manchester	38	19	19
Cardiff	7	5	2	Newcastle	12	5	7
Carlisle	12	6	6	Northampton	5	2	3
Carmarthen	23	16	7	Norwich	4	1	3
Carnarvon	3	0	3	Nottingham	16	10	6
Cheltenham	4	1	3	Oxford	2	0	2
Darlington	8	4	4	Peterborough	6	4	2
Dundee	8	5	3	Sheffield	12	9	3
Edinburgh	29	16	13	Shrewsbury	6	2	4
Exeter	13	9	4	Southampton	11	6	5
Glasgow	15	9	6	Truro	8	5	3
Guernsey	1	1	0	Worcester	4	1	3
Hull	7	2	5	York	14	7	7
Inverness	8	4	4				

The questions set for this examination will be found in the Journal for the 16th inst., p. 851.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At a meeting of the Chemical Society held on Thursday, April 21, Mr. William Crookes, F.R.S., President, in the chair, the following were elected Fellows of the Society:—Messrs. W. C. T. Beasley, E. R. Blundstone, S. F. Burford, J. W. Chenhall, G. Collar, H. Danber, jun., H. Gordon, W. Gregory, D. L. Howard, E. Rawlins, L. H. Schubert, L. O. Simmons, S. Sutcliffe.

The following papers were read:—

The Atomic Weight of Gold. By T. E. Thorpe, F.R.S., and A. P. Laurie, B.A.—Former determinations of the atomic weight of gold have been made by Dalton, Proust, and Oberkampf, in 1806; Berzelius, in 1813; Pelletier, Javal, and again by Berzelius, in 1844; by Levol, in 1850; and Thomsen in 1876. The numbers obtained differ widely from each other, partly owing to the unstable character of the salts of gold, and partly to imperfect methods of analysis. The number usually accepted is 196·2, being the value obtained by Berzelius in his second series of determinations, from the analysis of the double chloride of gold and potassium. A special reason for undertaking a revision of the atomic weight of gold arises from the circumstance that a higher value than that usually assigned to this element is demanded by the periodic law. The salt employed by the authors was the bromide of gold and potassium, which crystallizes readily from water, and (as proved by a series of analyses of different crystallizations) is stable at ordinary temperatures. The salt was prepared by digesting together gold, water, bromine and potassium bromide, and was then three times crystallized. The figure representing the mean of twenty-five experiments was 196·850.

The Atomic Weight of Silicon. By T. E. THORPE, F.R.S., and J. W. YOUNG, B.A.—The authors have attempted to redetermine the atomic weight of silicon by estimating the quantity of silica yielded by decomposing known weights of silicon tetrabromide by means of water. The result of the experiments was to give the atomic weight of silicon as 28·332 if H = 1.

Note on Substitution in the Benzene Nucleus. By H. FOSTER MORLEY.

Reply to the Foregoing Note. By HENRY E. ARMSTRONG.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the Chemists' Assistants' Association on Wednesday, the 20th inst., Mr. H. H. Millhouse in the chair, a paper was read on—

THE NEW ANTIPYRETICS.

BY T. S. DYMOND.

The large number of substances recently introduced, reputed to possess great antipyretic power, has suggested that a concise and comparative summary would be of use. Under the headings of "Chemical Relations," "Preparation," "Characters and Tests," "Physiological and Therapeutical Properties," and "Medicinal Use," resorcin, hydroquinone, antifebrin, antithermin, acetylamidophenol, quinoline, kairin, thallin, and antipyrin have been separately treated. In the first and second divisions, some other bodies have been introduced to show more clearly the successive steps by which these bodies are built up, and in the last two divisions the well-known antipyretics are incorporated in order to demonstrate their comparative value.

CHEMICAL RELATIONS AND PREPARATION.

The structural formulæ and processes for preparation to which these two divisions are devoted have, unknown to the author at the time this paper was written, appeared almost simultaneously in a German publication, a translation of which will be found on a previous page of this Journal (p. 886).

CHARACTERS AND TESTS.

Resorcin crystallizes in rhombic prisms, colourless, but becoming red on exposure to the air, inodorous, with a sweetish acrid taste. Melting point 118° C. It distils unchanged. It is readily soluble in water (1 in 2) and in alcohol. It gives a purplish-black colour with ferric chloride, disappearing on the addition of ammonia. The commercial drug occurs in white crystalline plates.

Hydroquinone crystallizes in rhombic prisms or monoclinic plates, colourless, inodorous, with a faint sweetish taste. Melting point 169° C. It sublimes unchanged. It is soluble in water (1 in 20) and very soluble in hot water and in alcohol. From its solution a small quantity of ferric chloride throws down lustrous green needles of quinhydrone, while excess of the reagent precipitates yellow quinone. The commercial drug occurs either in crystals or plates.

Antifebrin crystallizes in colourless plates resembling boric acid, odourless, producing a slight burning sensation on the tongue. Melting point 113° C. It distils unchanged. It is soluble in 189 parts of water at 6° C. and is freely soluble in alcohol. The drug occurs commercially as a pure white crystalline powder or in crystalline plates. Warmed with nitric acid it gives an orange coloration.

Acetylamidophenol occurs in small colourless or faintly reddish needles, slightly soluble in water, but more so in absolute alcohol and acetic acid. Melting point 135° C.

Antithermin.—The characters have not yet been published.

Quinoline is a mobile, volatile, colourless liquid with an alkaline reaction, a pungent aromatic odour, and giving a burning sensation on the tongue. It does not congeal at −20° C., b. p. 238° C., sp. gr. 1·081 at 10° C. It is sparingly soluble in water, but readily in alcohol. From its solution potassium bichromate throws down a yellow crystalline precipitate. Ferric chloride does not affect a solution of hydrochloride of quinoline. The tartrate is most often employed. It occurs in white needle-shaped crystals soluble in water (1 in 40). The less soluble salicylate is occasionally used.

Kairin crystallizes in rhombic prisms, colourless, inodorous, and with a bitter taste. It is soluble sparingly in water and readily in alcohol. A solution of the hydrochloride is rendered dark purple by potassium bichromate, and dark brown by ferric chloride. The commercial drug is the hydrochloride, $C_{10}H_{13}NO.HCl.H_2O$ ("kairine"). This occurs as a greyish crystalline powder, with a faint odour of phenol, freely soluble in water and alcohol.

Thallin crystallizes in large prisms, colourless, inodorous, with a bitter saline and pungent taste. Melting point 42° C. Sparingly soluble in water, readily in alcohol. A very dilute solution of the sulphate gives with ferric chloride, first a yellow, then an emerald green coloration unchanged by sulphuric acid. The commercial drug is the sulphate ("thallin"), $(C_{10}H_{13}NO)_2.H_2SO_4.2H_2O$. This occurs as a granular or crystalline powder, usually reddish in colour, and having a faint odour resembling anise and meadowsweet. It is readily soluble in water (1 in 5), but sparingly in alcohol, and the solutions become darker on exposure to light.

Antipyrin crystallizes in rhombic prisms, colourless and inodorous, with a rather pleasant sweetish bitter taste. Melting point 113° C. It decomposes at a higher temperature. It is readily soluble in water and alcohol. The solution gives a deep red coloration with ferric chloride, changing to yellow with sulphuric acid.

It has long been the endeavour of scientific men to establish a relation between the physiological and physical characteristics of the elements and their compounds. Blake and Rabuteau have attempted to show that the elements increase in their poisonous properties in the same ratio as their atomic weights, and Papillon that the spectroscopic characters vary with the physiological action. These theories have broken down, but still some such relationships are observable, and Blake has shown that, with some exceptions, those metals which form isomorphous salts have the same physiological action, and the physiological power increases with the atomic weight of the members of these isomorphous groups. Thus the salts of calcium (40), strontium (87) and barium (137), all paralyse the ventricles of the heart, and in power in the order named. It is noticeable that most of these antipyretic substances are isomorphous, crystallizing in rhombic prisms.

The physiological action of the various groups of the carbon compounds is a vast field open for research, for the science of pharmacology, in its modern sense, is still in its infancy. It is, however, known that the distinctive action of the lower members of the fatty series of the carbon compounds is stimulant and anæsthetic, while that of the lower members of the aromatic series is antiseptic and antipyretic. Both groups affect the nervous system, but the former affect the sensory centres, and so produce anæsthesia, while the latter affect the motor centres, and so produce convulsions and paralysis. The introduction of the radicle hydroxyl into these aromatic compounds tends to intensify the convulsant action, while the introduction of the radicle methyl has a paralysing action, and when it is introduced into the molecule of the convulsant alkaloid strychnine, or the non-convulsant alkaloid morphia, it gives a paralysing action to the derivatives. From these facts Crum Brown, Fraser and Schroff have come to the conclusion that it is possible to modify the chemical action of a drug by modifying its chemical constitution. Lauder Brunton and Cash have also found that most of the alkaloids in which a union is made between the amidogen and the methyl radicles in the alkaloids have a paralysing action, and its power, it is said, is greater than when the methyl

radicle is not in connection with the amidogen in the alkaloid. Isomeric bodies may have a very different action. Thus salicylic acid—orthooxybenzoic acid—is antipyretic, while meta- and paraoxybenzoic acids are not. Resorcin, pyrocatechin and hydroquinone are all antipyretic, but in very different degree, and their antipyretic action bears no relation to the different positions of their hydroxyl groups. The lower members of the quinoline series act on the sensory centres of the brain, and the higher members on the motor centres. Of these compounds any two members which have the same amount of carbon and nitrogen but a different amount of hydrogen, that one will be most physiologically active which contains the most hydrogen. Thus parvoline, $C_9H_{13}N$, is more powerful than quinoline, C_9H_7N.

Trials are now being made to produce artificial alkaloids which shall possess a strong antipyretic action without depressing the heart or causing sickness. The success that has already been achieved illustrates the use of a thorough knowledge of organic chemistry. The physiologist has only to indicate to the chemist the theoretical compound he requires, be it of never so complicated a nature, and the chemist has but to follow certain processes, as definite as the processes by which the more simple inorganic compounds are formed, to introduce one radicle into one place and another radicle into another place till he has built up the compound that he requires.

The therapeutical value of these new antipyretics cannot be estimated alone by their antipyretic power, but their action on the specific febrile process must be also studied. For this purpose the following definitions are introduced.

Fevers are divided into two classes:—(1) Idiopathic, in which the fever is part of the disease, and (2) Symptomatic, in which the fever is induced by the disease, as in pneumonia and erysipelas. Idiopathic fevers are further divided into (i) specific fevers, such as typhoid fever, scarlet fever, etc., and (ii) malarial fever. Malarial fevers are again divided into (*a*) intermittent fevers, which come and go at regular intervals, as ague, and (*b*) remittent fever, in which the paroxysms do not intermit, but only remit in severity till the fever overcomes or is overcome.

A febrile temperature may therefore be induced—

(1) By idiopathic fever.

(2) As a symptom of inflammatory diseases, especially the hectic fever which accompanies a wasting disease, such as phthisis.

(3) By simple exposure to heat. This increases tissue change, and so a febrile temperature is kept up after the external temperature has fallen. This is called thermal fever.

Ferments are either (1) organic, such as emulsin or pepsin, or (2) organized. Drugs which arrest fermentation are called antizymotics. Those which arrest organized ferments are either (1) antiseptics, or (2) disinfectants. Antiseptics arrest septic decomposition due to bacilli, and disinfectants destroy the poisonous microbes of communicable diseases.

Antiperiodics lessen the severity, and prevent the return of periodical diseases, and do so by preventing the development of the spirilla in the blood which cause remittent fever, and of the bacilli that cause intermittent fever.

Antipyretics reduce the temperature (1) by reducing the action of the heart and pulse; (2) by producing perspiration, and so increasing external radiation and loss of heat; (3) by dilating the capillaries, and so increasing internal radiation and loss of heat; (4) by acting on tissue change, and so reducing the production of heat; and (5) by reducing the oxidizing power of the red blood corpuscles, and so the production of heat.

PHYSIOLOGICAL AND THERAPEUTICAL PROPERTIES.

Resorcin first stimulates then paralyses the nerve centres. This is accompanied with dilatation of the blood-vessels, and hence it reduces the temperature by increasing heat radiation. In high fever the reduction of temperature is accompanied by subsidence of pulse and by profuse sweating, and it takes place with resorcin more quickly than with salicylic acid or quinine, though the effect is more transient. It is antizymotic, being a powerful antiseptic, disinfectant and deodorizer, and has been stated to be a useful antiperiodic. The disadvantages attending its use are profuse perspiration, the short duration of the antipyretic action, and the rapidity with which the temperature again rises.

Hydroquinone has the same action as resorcin, but it is about four times more powerful. It also diminishes the oxidizing power and heat production of the red corpuscles. The drawbacks to its use are not so great as those of resorcin, and it maintains clearness of mind and senses.

Pyrocatechin has the same action as resorcin, but it is about three times more powerful.

Salicylic acid first stimulates, then paralyses the nerve centres, and in febrile states lowers the pulse rate, blood pressure and respiration. It lessens production of heat by acting on tissue change. In febrile states the temperature is reduced about 3° C. It is a powerful antipyretic, destroying bacteria and torula, and preventing alcoholic and organic fermentation. A drawback to its use is that it produces deafness, giddiness and headache when taken for some time, and cardiac complications may ensue.

Antifebrin rapidly reduces the temperature and pulse rate. The effect lasts three to seven hours. It is said to be about four times as powerful as antipyrin, and its use is not followed by vomiting or diarrhœa, though there is some tendency to collapse.

Acetylamidophenol is said to be an active and harmless antipyretic.

Antithermin is said to be a powerful antipyretic.

Quinoline is a powerful antiseptic and antipyretic, but is apt to produce irritation of the stomach and collapse.

Kairin is a powerful antipyretic, and reduces temperature by acting on tissue change. It reduces the pulse and usually produces copious perspiration. The febrile temperature is usually reduced $\frac{1}{2}$° to 2° C., the action taking place in twenty-five minutes and lasting two to three hours. Its action is somewhat uncertain, and it is apt to induce vomiting, cyanosis and collapse.

Thallin lessens production of heat by reducing the oxidizing power of the red blood corpuscles, while it increases the loss of heat by dilating the cutaneous vessels and so increasing radiation. Its effect is more rapid than antipyrin and less so than kairin, the minimum temperature being reached in one hour, but it lasts four or five hours. It usually causes profuse sweating and is apt to produce depression of strength and other ill effects.

Antipyrin first stimulates, then paralyses, the nerve centres. It slightly increases blood pressure, but has no action on the respiration. It dilates the cutaneous vessels and so increases loss of heat by radiation. The reduction of temperature takes place almost immediately and reaches a minimum in four to six hours. Thirty grains given hourly for three hours reduce the febrile temperature for one to twenty hours. The rise of temperature is occasionally accompanied by rigor. The drawbacks to its use are that it induces profuse sweating and feeble pulse, vomiting and occasionally collapse.

Quinine in small doses stimulates and in large doses paralyses the nerve centres, the pulse rate and the blood pressure are therefore diminished, the blood-vessels become dilated and heat is lost by radiation. The production of heat is diminished by its acting on tissue change, and by diminishing the oxidizing power of the red blood corpuscles, which are at the same time increased in size. The movements of the white blood corpuscle, are checked. Quinine is a powerful antiseptic, destroying low animal and vegetable life, arresting alcoholic fermentation and diminishing some forms of organic

fermentation. A drawback to the use of quinine is that it causes deafness and headache when it has been taken for some time.

Aconite acts as an antipyretic merely by reducing the action of the heart, and therefore the pulse rate and temperature. It is used to give relief in symptomatic fever.

MEDICINAL USE.

Resorcin.—5 to 30 grains are given for a dose. It may be conveniently dispensed with syrup of orange and water. It does not shorten the duration of fever, whether idiopathic or symptomatic, except perhaps malarial. It lowers the temperature in phthisis and typhoid, and to a less extent in pneumonia and erysipelas.

Hydroquinone.—15 to 90 grains may be given daily in divided doses. It exercises a favourable antipyretic influence in almost all fevers, but has no better effect than resorcin on their duration.

Salicylic Acid.—Sixty or more grains per diem in divided doses are given at intervals of a half to four hours, or 5 to 15 grains for a single dose. It acts as a powerful antipyretic in acute rheumatism, and less so in typhoid fever. It has also some antiperiodic power, though much less than quinine, but beyond this it has no effect on the specific febrile process. It has, however, the power of removing the excretions of urea and uric acid in cases of rheumatism, and especially gout.

Antifebrin.—The dose is 4 to 15 grains, not exceeding 30 grains in twenty-four hours. It has been given with some success in typhoid fever, erysipelas, rheumatic fever, etc.

Acetylamidophenol.—3 to 30 grains are given for a dose.

Antithermin.—The dose has not yet been stated.

Quinoline.—7 to 12 grains of the tartrate may be given for a dose. It is powerfully antipyretic in all fevers.

Kairin.—3 to 30 grains of the hydrochloride ("kairin") are given for a dose. Four grains may be given every one to three hours, gradually increased to 15 grains, and then decreased again. It is best given in wafer paper or capsules. It reduces temperature in all fevers.

Thallin.—4 to 12 grains and more recently 3 grains are given for a dose. It is used in all fevers with powerful antipyretic effects.

Antipyrin.—From 7 gradually increased to 90 grains (30 grains hourly for three hours) may be given per diem. It has a powerful antipyretic action in typhoid fever and phthisis, and to a less degree in erysipelas, pleurisy and pneumonia.

Quinine.—As an antiperiodic 6 to 60 grains are given, and it is invaluable in malarial fever. 5 to 20 grains are efficient as an antipyretic in typhoid, scarlet and enteric fevers, etc. It does not shorten the duration of these fevers, but in small doses it is valuable as a tonic at a certain stage of the disease. One large dose daily is given in symptomatic fever, though in pneunomia its beneficial effect is doubtful. It is but little used in rheumatism.

In considering the relative value of these new antipyretics, one must be careful to remember that the high temperature is merely one of the symptoms of the fever, whether idiopathic or symptomatic, and that in idiopathic fevers the body has become poisoned, and the high temperature may be regarded merely as a safety valve. There are medical men who go so far as to say, that unless the antipyretic arrests or abridges the specific febrile process, it is useless. But we have also to remember that under the influence of high temperature, tissue change goes on very rapidly and exhausts the body, while a very high temperature may cause death. We find, then, of those antipyretics in common use whose action has been sufficiently studied, that antipyrin, antifebrin, thallin and kairin act simply as antipyretics, and have no action on the disease itself. Of these antipyrin and antifebrin are perhaps the most powerful.

Resorcin, hydroquinone, salicylic acid and quinine are also more or less powerful antipyretics; quinine the most certain, and salicylic acid the most powerful in rheumatic fever only; but they are also more or less powerful antiperiodics, quinine by far the most so, and they therefore arrest the fever of malarial diseases, though they have no effect in arresting the disease in typhoid, scarlet fever, etc. These drugs have all certain drawbacks. Kairin and resorcin interfere with the digestive system, induce profuse perspiration, interfere with the heart's action even to collapse, and the temperature rises with a chill. Hydroquinone, thallin, antipyrin and antifebrin, all are followed by one or more of these after-effects, to a less extent. Salicylic acid comes next and then quinine, the administration of which is almost free from serious consequences. Whether, therefore, we look on these drugs with regard to their antipyretic and antiperiodic value, or whether we look at their freedom from dangerous concomitant symptoms, the best, by far, is quinine.

In the discussion which followed the reading of the paper Mr. J. E. Saul remarked that no mention had been made of the use of piperonal and lantanine as antipyretics. The former had been employed in a dose of 75 centigrams every two or three hours, whilst lantanine, the alkaloid of *Lantana brasiliensis* (*Pharm. Journ.*, [3], xvi., 289), had been stated to have been effectively used in intermittent fevers that had not yielded to treatment with quinine. The administration of two grams in twenty-four hours, given in doses of 10 centigrams each, is said to have effected a cure in 95 per cent. of the cases in which it had been employed. Mr. Saul also drew attention to the fact that the dose of thallin sulphate had been reduced from 4 to 12 to 3 to 8 grains, and that thallin tartrate is also now sometimes employed. In view of possible confusion arising out of the name of this compound, Mr. Saul pointed out thallin gives a green colour with silver nitrate, auric chloride, and chromic acid.

Mr. W. G. Blackham referred to the use of picrate of ammonia as an antipyretic. It had been asserted by Dr. Clarke that in doses of less than 1 gram it had been employed in some ten thousand cases with success. He also considered that Mr. Dymond had not drawn sufficient distinction between disinfectants and antiseptics in his definition of those bodies.

Mr. Dymond briefly replied, and said that he wished to express his thanks to Mr. Holmes for lending him specimens from the Museum of the Pharmaceutical Society, enabling him to illustrate his paper.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

At the last meeting of the Liverpool Chemists' Association, the following paper was read:—

Note upon Fluid Extract of Cinchona Bark.

BY A. C. ABRAHAM.

For the preparation of fluid extract of bark with water only I have always advocated the employment of that water at, or near, the boiling temperature.

This preference, together with a very suggestive article by Dr. Paul (*Pharm. Journ.*, vol. xvi., p. 56), prompted me some time since to try to effect the removal of the alkaloids *soluble in water with water only*, and the subsequent removal of those insoluble in water by means of an acid menstruum.

The three following experiments were tried upon a bark bought from a good house as containing quinine 1·94; quinine and cinchonidine 4·34. Total alkaloids 6·52.

It was a quill bark, and was, therefore, chosen in pre-

ference to others richer in quinine, which, being in the state of scrapings, did not answer the description of the Pharmacopœia.

It was, as will be seen, well over the Pharmacopœia standard, and as the resulting fluid extract had to be estimated, I did not consider it necessary to confirm, in any way, the guaranteed analysis under which I had bought it.

1*st Experiment.*—Five lbs. treated exactly as ordered in the Pharmacopœia produced 51·2 fluid ounces of fluid extract of the required strength.

2*nd Experiment.*—Five lbs. was percolated with boiling distilled water until 6½ gallons had passed (the same quantity as was collected in experiment 1), and when evaporated with the quantity of glycerine ordered in the Pharmacopœia produced 43·52 fluid ounces of product of the standard strength.

3*rd Experiment.*—The residue from the last was percolated with 2½ gallons distilled water acidified with 2¼ fluid ounces of hydrochloric acid: product 35·88 fluid ounces of the required strength, viz., 5 per cent.

Since making these three tests, I have repeated with another bark experiment No. 3. The percolate in this case was *neutral*, and, consequently, of course very weak, and I found it necessary to double the acid before I could produce any decided effect in the way of taking out the remaining alkaloids.

It will be seen that by the official process, a product of 51·2 fluid ounces was obtained, and that by the use of boiling water, and subsequently of the acid, the product was altogether 79·4 fluid ounces, showing an increased yield of 28·2 fluid ounces by operating in this way. The conclusions which I draw from these facts are—

1*st.*—That if we want to have a fluid extract representing as far as possible the bark from which it is made in a unaltered state we should certainly let water do what it can, and then, if we wish to add an acid solution of the cinchona alkaloids to it, treat the residue with an acid menstruum.

2*nd.*—That in the latter case the acid menstruum should be at least double the strength of that ordered by the Pharmacopœia. I may say that my preference for boiling water is not founded upon any experiments with such barks as are now official, but with the old flat calisaya. Nevertheless I have every reason to believe that what holds for the one holds for the other, and that in either case a given quantity of boiling water will remove more than can be removed by an equal quantity of cold; partly by its superior solvent action and partly by removing certain matters (which are afterwards thrown out on cooling) which interfere with the action of the menstruum.

REGISTERED CHEMISTS' TRADE ASSOCIATION OF LIVERPOOL.

The eleventh annual meeting of this Association was held at the Royal Institution, Colquitt Street, on Thursday, April 7. The Vice-President, Mr. B. Dickins (in the unavoidable absence of the President, Mr. Councillor Woodcock), occupied the chair.

The annual report was read as follows :—

"In presenting the annual report, the Committee have the pleasure of stating that the year which has passed has been comparatively free from events prejudicial to the interests of the trade. Legislation has been of such a kind as to merit the approval of the Committee. Sir John Lubbock's Early Closing Bill was carefully considered, and the principles were approved of by the members.

"As the seventh edition of the Liverpool Chemists' Price List was issued shortly before the British Pharmacopœia, 1885—the stock at that time being exhausted, and there being a considerable demand for the list—the Committee, in order to bring it up to date, have issued a List of Additions to the Price List, containing the new preparations of the B.P., 1885, and other articles in frequent use. Copies may be had free, on application to the Treasurer or Secretary, by enclosing a stamped envelope.

"The usual donation of two guineas has been voted to the Benevolent Fund of the Pharmaceutical Society.

"In order to increase the number of members of the Association and make its objects better known, the rules of the Association have been reprinted, and copies were circulated to every chemist in Liverpool and suburbs.

"By the deaths of Messrs. Ellithorne and Wright the Association has lost two valued members. Two have resigned. Four new members have been enrolled.

"The annual supper was held at the Merchants' Dining Rooms, Castle Street, on March 17, and was an unqualified success. The attendance of members and their friends was the largest on record. The recitations and musical selections were of an exceedingly high order, and greatly contributed to the pleasure of the evening.

"Copies of the Register of Pharmaceutical Chemists and Chemists and Druggists for the current year have been presented by the Pharmaceutical Society, and can be seen on application to the President, Treasurer or Secretary.

"The Treasurer's statement of account to December 31, 1886, duly audited, shows a balance of £11 14*s.* 8*d.*, exclusive of £5 6*s.* 8*d.* due for price lists, and a stock of four hundred and seventeen lists in favour of the Association."

The Treasurer's financial statement having also been read, it was proposed by the Chairman, seconded by Mr. J. S. Ward, and carried, "That the report and financial statement be adopted, and the Secretary be instructed to have them printed, and a copy sent to each chemist in Liverpool and Birkenhead."

Mr. Parkinson proposed, and Mr. Day seconded, a vote of thanks to the President, Mr. J. Woodcock, C.C., for his valuable services during the year, which was carried by acclamation.

Mr. Kirkus proposed that Mr. B. Dickins be elected President for the ensuing year. The motion was seconded by Mr. Parkinson, and was carried unanimously.

The following retiring members of the Committee were re-elected, viz., Messrs. Alexander, Hocken, Parkinson, Redford and Warhurst, and Messrs. T. F. Abraham and J. S. Ward were elected to fill two vacancies.

Votes of thanks to the officers for their services during the year having been passed, the proceedings terminated.

At a meeting of the Committee of the above Association, held on the 20th inst., Mr. B. Dickins, President. in the chair, Mr. J. Hocken was unanimously elected Vice-President. Messrs. R. Parkinson and John Bain were respectively re-elected Honorary Treasurer and Honorary Secretary.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The fourth monthly meeting was held at the Grand Hotel, Colmore Row, Birmingham, on Thursday evening, April 21, when Mr. A. Southall, F.C.S., occupied the chair. The following paper was read :—

The Composition of the Ash of Ipecacuanha Root.

BY H. E. MUNNS.

Having had occasion to do a considerable amount of work upon ipecacuanha, I found that in the literature of the subject the composition of the ash had been entirely neglected. I therefore selected a sample containing about the normal percentage of emetine, and made a careful analysis of the ash obtained by slow incineration. This amounted to 3·22 per cent, and had the following composition :—

Silica	31·98
Iron and Alumina	3·53
Lime	15·98
Magnesia	4·57
Phosphoric anhyd.	6·19
Alkalies	13·80
Sulphuric anhyd.	4·84
Chlorine	1·56
Carbonic anhyd.	15·25
Undetermined, including trace of manganese	2·30
	100·00

Mr. Thonger proposed, and Mr. Perry seconded, a vote of thanks to the author.

In the discussion the following took part :—The Chairman, Messrs. Perry, Thonger and Alcock.

The following paper was then read :—

Linimentum Terebinthinæ.

BY GEORGE E. PERRY,
Pharmaceutical Chemist.

Since the issue of the present edition of the British Pharmacopœia the preparation of this liniment has been perhaps the most fruitful source of disagreement and discontent. The majority of pharmacists—the best of us amongst the number—have experienced, it would seem, more or less difficulty in getting a satisfactory product when adhering strictly to the official form and directions.

Having myself, long before the present Pharmacopœia came into existence, had some trouble with this liniment, and having arrived at what I considered a solution of the difficulty; having too, in common with others, failed more than once in making, by the official form, a presentable preparation, and having in consequence been led to undertake a fresh series of experiments, I have thought that a note from me on the subject might not be without interest to the members of this Association.

First then as to the *characters* of this liniment. Until very recently we have had nothing to help us on this point; no official description such as, I submit, ought to be annexed to every preparation the characters of which, from any cause, ingredients, method of making, etc., are likely to vary. Professor Redwood, however, in his very useful paper—and he speaks of course *ex cathedrâ*—has now told us what the liniment was intended to be when carefully prepared with proper materials according to the directions given in the Pharmacopœia. He says "the liniment should be a thick, creamy emulsion," but further on he adds that "if carefully and well prepared with neutral or nearly neutral soap, the product will be too thick to admit of its being easily put into a bottle with a narrow neck; it should be put into an open-mouthed bottle, because after standing for some days it usually becomes more liquid, and too much so to admit of its being conveniently kept in a covered pot."

To a "creamy emulsion" no objection can be taken; but if its character is to be such as Dr. Redwood describes, I think the liniment will prove itself—as I shall show it is—a very undesirable preparation; in common phraseology "neither one thing nor another." What in my opinion we should rather aim at producing is a preparation similar, as far as its fluidity is concerned, to the lin. ammoniæ of the Pharmacopœia,—a liquid, not a semi-solid, capable of being dispensed in the ordinary way in a narrow-mouthed bottle.

Now as to the method of preparation. Professor Redwood says that given a fairly neutral soft soap, with scientific manipulation there should be no difficulty in producing a satisfactory emulsion, having the characters to which I have alluded. With regard to the soap, he admits that the presence of a small amount of carbonate, which he found in all commercial samples, though detrimental pharmaceutically, might be of advantage than otherwise from a therapeutic standpoint. He, however, lays great stress on *manipulation*. He stipulates for a certain form of mortar and pestle, and a gradual and careful blending of soap, water and oil to ensure, what he implies is otherwise unattainable, a perfect preparation.

Mr. Martindale, too, is of opinion that it is "chiefly a a question of manipulation;" though it should be noted that he experimented with but very small quantities,—a different matter than when making even the pharmacopœial quantity, to say nothing of still larger quantities.

This particular manipulation I find to be altogether unnecessary for making what *I* call a satisfactory preparation. If the camphor is first dissolved in the turpentine, and to this the soap added, and the bottle shaken occasionally till the soap is in solution, adding the water last; or, better still, if to the camphor dissolved in the turpentine, both the soap and water are added, and the bottle shaken as before, even with the Pharmacopœia proportions, a good emulsion is the result.

But here, unfortunately, the form "blocks the way." For what I have to contend is, that in whatever manner the liniment is made from the form as it stands, it will not be *permanent*. Sooner or later, thickening takes place, and the liniment ultimately becomes gelatinous and unusable.

We have had several suggestions for remedying this defect. The one which seems to have found most favour is that of adding an extra quantity—double the quantity—of water. This, I think, to be decidedly objectionable therapeutically. The presence of an excess of water in such a preparation must, I take it—and I have had medical confirmation on this point—interfere, to a greater or less extent, with the absorbent action of the turpentine, and consequently detract from its rubefacient properties. The mistake, I think, has been in adding, as it is, too much water. What is needed, in my opinion, to make this preparation therapeutically and pharmaceutically satisfactory is *more* soap and *less* water.

On the table will be found samples of the liniment prepared as follows :—

No. 1. . .	B.P. proportions.				
„ 2. . .	2½ oz.	of soap, and	1½	oz.	of water.
„ 3. . .	3 oz.	„	1	oz.	„
„ 4. . .	4 oz.	„	1	oz.	„

No. 1.—Made about a month ago, was for some little time fairly satisfactory; but you will see it is already in an advanced gelatinous condition, and before long it will be impossible to get it out of the bottle.

No. 2.—Is not much better.

No. 3.—Though a better preparation, is not altogether satisfactory.

No. 4.—Containing 4 ozs. of soap and 1 oz. of water, and made by the latter of the two methods I have mentioned, is, as far as my experience goes, as good a preparation as it is possible to get by a modification of the present formula. It is an elegant, creamy emulsion, readily made, and always "pourable"; and though a slight separation will take place after a time—a property common to all emulsions—the liniment is what may be termed practically permanent.

This then is the form I would venture to suggest might with advantage replace the present one. An additional quantity of soap, in place of a portion of the water, cannot, I think, be objected to, seeing the value that of late has been attached to the action of oleates on the skin; while pharmaceutically the preparation leaves little to be desired.

A vote of thanks was proposed by Mr. Austin and seconded by Mr. Thonger.

A good discussion took place, in which the Chairman, Messrs. Hutton, Asten, Prosser, Austin and Alcock joined.

A paper by F. H. Alcock, F.C.S., on "Tr. Quinine and its Assay" was read next. The author made some

general remarks on the literature of the subject, and concluded by giving a process for the assay which he had found to be easy of application, and to give uniform and fairly accurate results.

A vote of thanks was proposed by Mr. Thompson and seconded by Mr. F. H. Prosser.

The subject was discussed by the Chairman, Messrs. Munns, Perry, Thompson, Liverseege, Thonger and Prosser.

A successful meeting was terminated by a vote of thanks to the Chairman, which was proposed by Mr. Perry and seconded by Professor Elliott, and carried unanimously.

The next meeting will be held in May, and is to take the form of a social and musical evening.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Pharmacy Acts Amendment Bill.

Sir,—I have seen a circular which is stated to have been distributed to Members of the House of Commons in opposition to the Pharmacy Acts Amendment Bill. I quote this circular paragraph by paragraph, and append a few remarks to each.

> "Pharmacy Acts Amendment Bill, 1887.—Before acquiring the legal title of 'chemist and druggist,' or the right to open an ordinary chemist's shop, any person must, under the existing regulations, pass a Preliminary examination, in which Latin is included; *and after having been for three years practically engaged in the translation and dispensing of prescriptions, must then* undergo a severe qualifying examination, both *vivâ voce* and practical, in the following subjects:—Chemistry, botany, materia medica, pharmacy, prescription reading, and dispensing."

The important words printed in italics do not appear as necessary conditions in the present Pharmacy Acts; one of the objects of the proposed Amendment Act is to supply the deficiency.

> "The degrees 'Master of Arts,' 'Doctor of Science,' 'Doctor of Laws,' and others, are granted to students who can pass the respective examinations of the University of London, whether they have obtained the knowledge required by private study or by any other means in their power; and yet the Council of the Pharmaceutical Society are endeavouring, by means of this Bill, to obtain powers to enforce an expensive curriculum on all intending chemists, although the average business produces but a meagre income."

Medical Degrees, however, are *not* thus granted by the London University. For these no one can offer himself for examination until he has fulfilled the prescribed curriculum. The reasons for this difference ought to be obvious, and the Council considers that they apply to the practice of pharmacy as they do to other departments of medicine.

> "Of course, if a monopoly is created it will be an advantage to those who already have the qualification, including the Council and members of the Pharmaceutical Society, who are all chemists.
>
> "Let the stringency of the examinations be increased if necessary, but do not let a costly curriculum be imposed, whereby students of small means, but perhaps large capabilities, will be shut out from a profession for which they are eminently suited."

As regards cost the Council thinks that as much will be saved to the students by the avoidance of repeated failures as will be spent in original preparation. The Council aims to create no further monopoly nor to raise the least additional impediment to the qualified man's approach to pharmacy. It seeks only to devise and carry out a process by which pharmaceutical students shall be *better trained* for their duties than they are at present, and that they may consequently come to the examination room with more confidence of success.

G. F. Schacht.

Concentrated Medicines.

Sir,—Medical men seem to be getting into the way of writing very concentrated and dangerous prescriptions, with the idea, I suppose, of saving their patients the expense of a 6 or 8 oz. mixture. I have just dispensed the following, written by a London consulting physician whose fee I am told was 21*s.*

℞. Tr. cantharides . . . . . ℥ij.

Sign. Five drops in two tablespoonfuls of water twice daily.

Within a very short time I have had the following:—

℞. Liq. arsenicalis . . . . . ℥ss.

Sign. Three drops in ℥i of water three times a day.

℞. Zinci sulph. . . . . ℥j.

Mitte xij.

Sign. Poison, one to be dissolved in half a pint of water and used as a lotion as directed.

℞. Syrup. Eastonii . . . . . ℥j.

Sign. Five drops in a teaspoonful of water three times daily.

Numbers of others I could mention, but do not wish to take up your space unnecessarily.

With the last-mentioned, being told that it was for a young child, and not seeing how an inexperienced person could, with any accuracy, measure 5 drops of syrup, I consider that I was quite justified in advising the customer to let me make it into such a mixture that a teaspoonful might be given for a dose. I think that the attention of the medical profession ought to be drawn to the danger they run in writing such prescriptions. Patients who can afford to pay 21*s.* or 10*s.* 6*d.* for a consultation would surely not object to paying 1*s.* or 1*s.* 6*d.* for the certainty of having a bottle of medicine properly prepared.

I trust that some of your correspondents may be able to suggest a means of mitigating this evil.

Leeds. C. A. J.

Huechys Sanguinea.

Sir,—Permit me to thank Mr. J. O. Braithwaite for his kindly correction *in re Huechys*.

Not being a "bug hunter," a cursory glance tells me only that *Huechys* is an insect, and my fragmentary note was written without any intention of ascribing it to a group. At the last moment I became responsible for the dictum of a naturalist friend. My account with him is not yet settled.

In a private communication received last week, Dr Porter Smith also informs me that *Huechys* is not Coleopterous but Homopterous.

15, *Laurence Pountney Lane.* John Moss.

Autograph Prescriptions.—We have been requested by Mr. Joseph Ince to say that he would be obliged if those who send him collections of autograph prescriptions, which are most acceptable, would forward at the same time name and address. They would invariably be acknowledged with thanks.

J. H. Smith.—'Water and Water Supplies and Unfermented Beverages' (W. Clowes and Sons). 1*s.*

P. H. Marsden.—(1) *Epilobium angustifolium.* (2) The species cannot be determined without the flowers. (3) *Scutellaria galericulata.* (4) *Euphrasia officinalis.* (5) *Trifolium minus.* (6) *Senecio Jacobæa.*

Orphanos.—You are recommended to lay your suggestion before the Benevolent Fund Committee; but meanwhile we do not think it desirable to publish anything that would tend to militate against the success of the dinner.

Progress.—A candidate for a Bell Scholarship must be a registered student or apprentice of the Society, under twenty-two years of age, and have passed not less, or been engaged not less than three years in the pharmacy of a registered chemist and druggist.

Communications, Letters, etc., have been received from Messrs. Crow, Baldock, Jacobi, Elborne, Gerrard, Flückiger, Delchevalerie, Griffin, Hagon, Progress.

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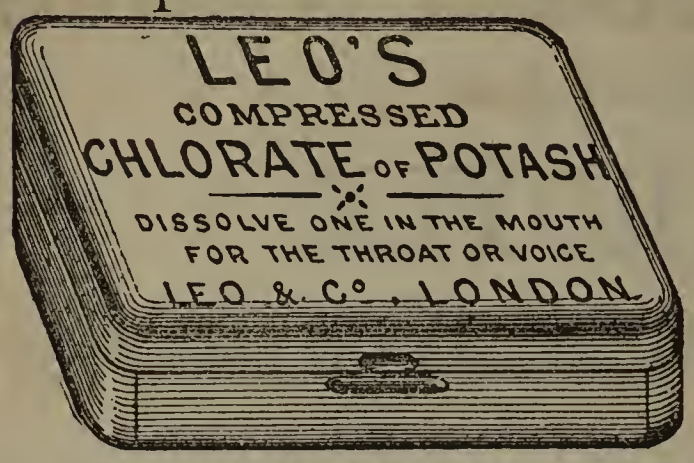

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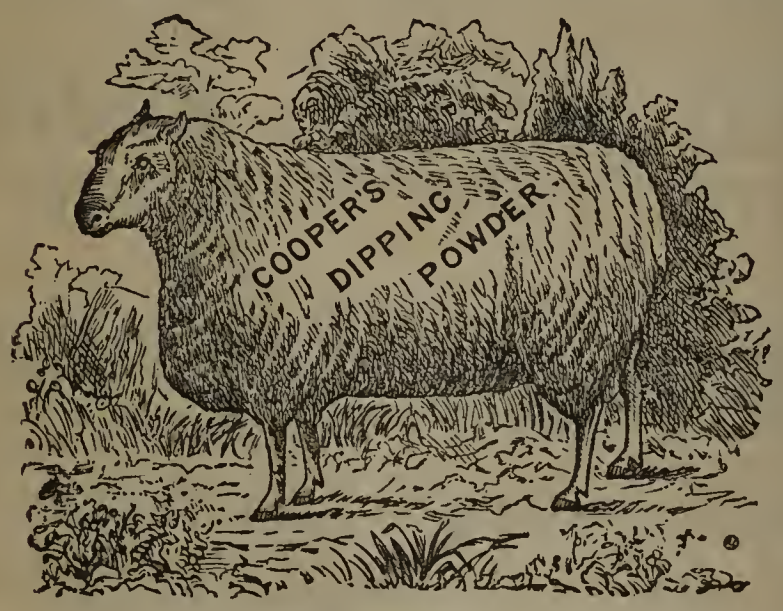

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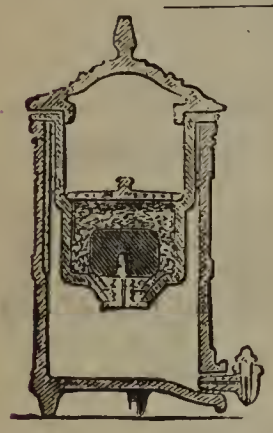

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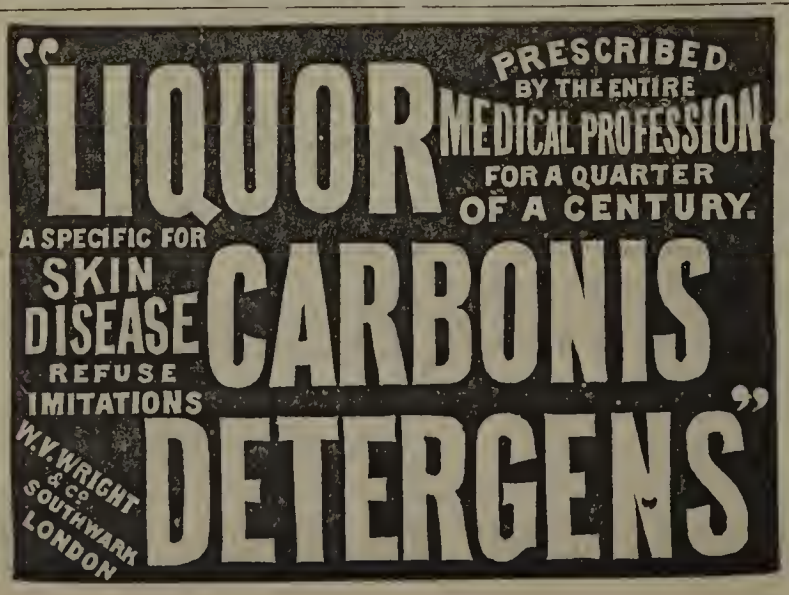

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CHARLES BROOKS deceased. Pursuant to the Act of Parliament, 22 and 23 Victoria, chapter 35, NOTICE IS HEREBY GIVEN, that all creditors and other persons having any claims or demands against the Estate of Charles Brooks, late of 355, Wandsworth Road, in the County of Surrey, Chemist, deceased (who died on the 14th day of April, 1887, and letters of administration to whose Estate were granted by the Principal Registry of the Probate Division of Her Majesty's High Court of Justice, on the 27th day of April, 1887, to Adelaide Mary Brooks, the widow), are hereby required to send particulars in writing of their claims or demands to me the undersigned, the Solicitor for the said Administratrix, on or before the 21st day of May next, after which date the said Administratix will proceed to distribute the assets amongst the parties entitled thereto, having regard only to the claims or demands of which she shall then have had notice, and she shall not be liable for the assets or any part thereof so distributed to any person, of whose claim or demand she shall not then have had notice. And all persons indebted to the said Estate are hereby required to pay or remit the amount of such indebtedness to me the undersigned. Dated this 27th day of April, 1887. ALFRED C. COPP, 37, Essex Street, Strand, London, W.C., and Hatherley, Wimbledon Hill, Solicitor for the said Administratix.

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The
Pharmaceutical Journal
AND
Transactions.

THIRD SERIES, No. 880.] SATURDAY, MAY 7, 1887. [PRICE FOURPENCE.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

ANNUAL GENERAL MEETING.

Notice is hereby given that the forty-sixth Annual General Meeting of the Members and Associates in Business of the Society will be held at 17, Bloomsbury Square, Middlesex, on Wednesday, the 18th day of May, 1887, at eleven o'clock in the forenoon, for twelve *precisely*, to receive the report of the Council, and to elect the Council and Auditors for the ensuing year.

EVENING MEETING.

36, YORK PLACE, EDINBURGH.

An Evening Meeting of the Society will be held at 36, York Place, Edinburgh, on Wednesday next, May 11th, at eight o'clock. The chair will be taken at half-past eight precisely by Mr. H. BELLYSE BAILDON, B.A. Cantab., F.R.S.E.

The following papers will be read :—

"An Accurate Method for Determining Specific Rotatory Power." By W. PEDDIE, B.Sc., F.R.S.E.

"Note on Solubilities." By D. B. DOTT, F.R.S.E.

"A Simple Method for Percolation under Pressure." By THOMAS MABEN.

"Irish Moss as a Substitute for Gum Arabic in Pharmacy." By PETER BOA.

"Remarks on Sugars used for Syrups." By PETER BOA.

MAJOR, MINOR AND MODIFIED EXAMINATIONS.

The Board of Examiners in England and Wales meets at 17, Bloomsbury Square, London, in February, April, June, July, October, and December, and the Board of Examiners in Scotland meets at 36, York Place, Edinburgh, in January, April, July, and October, for the purpose of conducting the above examinations. Candidates must give notice to the Registrar in London, and pay the fee on or before the *first* day of the month in which the Examinations are held. Each Candidate for the Major and Minor Examinations must, at the time of giving notice, produce a Registrar's Certificate of Birth, and a certified declaration that for three years he has been registered and employed as an Apprentice or Student or has otherwise for three years been practically engaged in the translating and dispensing of prescriptions. Printed forms of declaration may be obtained from the Registrar in London. Each Candidate for the Modified Examination must state the number of the receipt for his declaration and his age at the time of giving notice.

Candidates will receive notice of the date on which they will be required to present themselves.

CONVERSAZIONE.

By permission of the Lords of the Committee of Council on Education, the Annual Conversazione of the Pharmaceutical Society will be held at the South Kensington Museum, on the evening of Wednesday, May 18th, at eight o'clock.

Each Associate and Apprentice of the Society, and each Chemist and Druggist on the Register, may, on application to the Secretary, obtain a card of admission.

Invitations have been sent to each Member and Associate in Business of the Society.

N.B.—No person can be admitted *without a ticket.*

BENEVOLENT FUND

For the Relief of Distressed Members or Associates of the Society, of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

See Advertisement on next page.

BENEVOLENT FUND

FOR THE

Relief of Distressed Members or Associates of the Pharmaceutical Society, of Pharmaceutical Chemists, and Chemists and Druggists, and their Widows and Orphans.

A Dinner

IN AID OF THE BENEVOLENT FUND

WILL TAKE PLACE AT THE

Freemasons' Tavern, Great Queen St., Lincoln's Inn Fields,

On TUESDAY, MAY 17th, 1887.

THE PRESIDENT OF THE PHARMACEUTICAL SOCIETY IN THE CHAIR

Committee.

THE PRESIDENT.
THE VICE-PRESIDENT.
THE TREASURER.
CHARLES BOWEN ALLEN.
EDWARD NORTHWAY BUTT.
WALTER HILLS.
JOHN WILLIAMS.

The Committee will be glad to receive the names of any Gentlemen who will act as Stewards. The following have already consented to do so:—

List of Stewards.

Adams, Benjamin .. .. Mansfield, Notts.
Alexander, William .. 27, Low Street, Banff.
Allan, James Henry .. Royal Infirmary, Liverpool.
Allden, John .. .. .. 156, Cromwell Rd., S. Kensington, S.W.
Allen, Chas. Bowen .. 20, High Road, Kilburn, N.
Allis, William .. .. .. Alford, Lincolnshire.
Arkinstall, William.. .. 35, Gloucester Road, S.W.
Atkins, Saml. Ralph .. Market Place, Salisbury.
Attfield, Professor .. .. Watford, Herts.
Ault, John.. .. .. .. Fernilee, via Stockport.
Baildon, H. Bellyse .. 73, Princes Street, Edinburgh.
Baily, John .. .. .. 26, Ethelbert Road, Margate.
Baiss, Arnold .. .. .. 4, Jewry Street, E.C.
Ballard, Arthur .. .. Faringdon, Berks.
Barclay, George R. . .. 95, Farringdon Street, E.C.
Barker, William Robert 143, New Bond Street, W.
Barnes, James B. .. .. 1, Trevor Ter., Knightsbridge, S.W.
Barnes, Lawrence R. .. 10, Park Grove, York.
Barron, Frederick .. .. Bush Lane, E.C.
Bascombe, Fredk. .. .. 3, Grand Promenade, Brixton, S.W.
Bate, Henry .. .. .. 125, South Lambeth Road, S.W.
Beal, Edmund John .. High Street, Ilford, Essex.
Bell, Charles B. .. .. 6, Spring Bank, Hull.
Benger, F. Baden .. .. 7, Exchange Street, Manchester.
Bentley, Professor .. .. 38, Penywern Road, Earl's Court, S.W.
Bently, William J. .. ... High Road, Tottenham.
Bessant, F. Railton.. .. Westgate-on-Sea.
Bindloss, Geo. Fredk. .. 97, Leighton Road, N.W.
Bird, Augustus.. .. .. 82, Wood Lane, Shepherd's Bush, W.
Birkett, John .. .. .. 16, The Crescent, Morecambe.
Blunt, Thos. Porter.. .. Wyle Cop, Shrewsbury.
Borland, John .. .. 7, King Street, Kilmarnock.
Bottle, Alexr. .. .. . Townwall Street, Dover.
Bourdas, Isaiah .. .. 59, Belgrave Road, S.W.
Boutall, George Squire .. 52, Marchmont St., Russell Sq., W.C.
Bowker, Ellis .. .. .. Bury, Lancs.
Bowen, John Wm. .. .. 13, Curzon Street, Mayfair, W.
Bowerbank, Joseph .. Castlegate, Cockermouth.
Bremridge, Elias .. .. Park House, New Malden, Surrey.
Brown, Alfred James .. 55, Trafalgar Road, Greenwich.
Buck, Thomas .. .. .. East Street, Middlesbrough.
Buckle, James .. .. .. Market Place, Malton, Yorks.
Buckley, James J. .. .. 111, Earl's Court Road, S.W.
Bullock, J. Lloyd .. .. 3, Hanover Street, W.
Burden, Edwd. McMullen 37, Duke St., Grosvenor Sq., W.
Burdon, John .. .. .. Claypath, Durham.
Butler, Edwd. Henry .. Humberstone Gate, Leicester.
Butt, Edward Northway 13, Curzon Street, Mayfair, W.
Carteighe, Michael .. .. 180, New Bond Street, W.
Chapman, Henry .. .. 52, Newborough Street, Scarborough.
Chapman, Joseph John .. 20, Boundary Road, St. John's Wood.
Cole, Alfred C. .. .. . Comarques, Lee, S.E.
Cole, George .. .. .. 4, King Street, Jersey
Collier, Henry .. .. .. Guy's Hospital, Borough, S.E.
Cooper, Albert .. .. .. 80, Gloucester Road, S.W.
Cooper, Thomas .. .. 80, Sunderland Street, Macclesfield.
Corder, Octavius .. .. 31, London Street, Norwich.
Cowles, Charles .. .. 37, Broadway, Stratford.
Cox, Arthur H. .. .. 35, Wellington Villas, Brighton.
Cracknell, Herbert .. .. 17, Craven Road, Paddington, W.
Cross, Wm. Gowen .. .. 70, Mardol, Shrewsbury.
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Darroll, William .. .. Clun, Salop.
Davenport, Horace .. .. 33, Great Russell Street, W.C.
Davenport, Jno. T. .. .. 33, Great Russell Street, W.C.
Davidson, James N. .. 128a, Nethergate, Dundee.
Des Forges, Joseph Hy... 61, Lowgate, Hull.
Dodd, W. Ralph .. .. St. Andrew's Pavement, Amhurst Pk.
Down, Dr. J. Langdon .. 81, Harley Street, W.
Dunstan, Professor.. .. 17, Bloomsbury Square, W.C.
Ekin, Charles .. .. 143, New Bond Street, W.
Ekins, John .. .. .. 97, High Street, Bedford.
Elborne, William .. .. Owens College, Manchester.
Elliman, James.. .. .. Lancaster House, Slough.
Emsley, Joseph .. .. 41, High Street, Stoke Newington, N.
Evans, John .. .. .. Temple Gate, Bristol.
Farries, Thos. .. .. .. 16, Coleman Street, E.C.
Faulkner, Jas. Ross .. 33, Ladbroke Grove Road, W.
Fitch, Robert Owen.. ... 255, Well Street, South Hackney, E.
Fletcher, John .. .. .. Montpellier Avenue, Cheltenham.
Flux, William .. .. .. 3, East India Avenue, E.C.
Foster, Michael E. ... .. 50, Bishopgate Street, E.C.
Francis, Geo. Bult .. .. 5, Coleman Street, E.C.
Francis, Matthew R. .. 9, East India Dock Road, E.
Francis, William Hy. .. 5, Coleman Street, E.C
Frazer, Daniel .. .. .. 127, Buchanan Street, Glasgow.
Froom, Wm. Hy. .. .. 75, Aldersgate Street, E.C.
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Gale, Samuel .. .. 225, Oxford Street, W.
Gange, Geo. .. .. .. Enfield Town, Middlesex.
Gerrard, Alfd. Wm. .. University College Hospital, W.C.
Gibbs, William.. .. .. Clevelands, Shanklin.
Goodwin, John .. ... Lower Clapton, E.
Gostling, Thos. Preston Market Hill, Diss.
Granger, Harold .. .. High Street, Newhaven.
Greaves, William S. .. Ironville, near Alfreton.
Green, Isaac .. .. .. Tutbury, Burton-on-Trent.
Greenall, Alfred .. .. 10, South Road, Waterloo Lancs.
Greenhough, David Wm. 16, Mincing Lane, E.C.
Grecnish, Thomas ... ... 20, New Street, Dorset Square N.W.
Greenish, T. E. .. .. 5, Bathurst Street, W.
Grose, Nicholas Male .. 5, Castle Street, Swansea.
Gulliver, William .. .. 6, Lower Belgrave Street, S.W.
Hackman, Leonard L. ... St. Clare Terrace, Landport, Hants.

LIST OF STEWARDS—*continued.*

Ham, John .. .. .. Nether Stowey, Bridgwater.
Hampson, Robert .. .. 205, St. John Street Road, E.C.
Hanbury, Cornelius .. Plough Court, Lombard Street, E.C.
Handley, Charles .. The Elms, Stoke Newington, N.
Hardy, Samuel C. .. .. 177, Regent Street, W.
Hart, James .. .. .. 131, Embden Street, Manchester.
Harvey, Edward .. .. 6, Giltspur Street, E.C.
Harvey, Wm. Rivett .. 98, Humberstone Road, Leicester.
Havard, Benjamin .. .. Narberth, Pembrokeshire.
Herring, William C. .. 40, Aldersgate Street, E.C.
Hill, Arthur B... .. .. 101, Southwark Street, S.E.
Hill, J. Rutherford.. .. 36, York Place, Edinburgh.
Hillen, John .. .. .. 6, Havelock Ter., Forest Hill, S.E.
Hills, Walter .. .. .. 225, Oxford Street, W.
Hodgkinson, Chas... .. 198, Upper Whitecross Street, E.C.
Hodgkinson, Wm. .. .. 198, Upper Whitecross Street, E.C.
Holding, John .. .. .. 169, Hemingford Road, N.
Holmes, E. M. .. .. .. Bradbourne Dene, Sevenoaks.
Hopkin, Wm. King .. 16, Cross Street, Hatton Garden, E.C.
Hovenden, R. .. .. .. 31, Berners Street, W.
Howie, Wm. Lamond .. Cornbrook House, Eccles, Lancs.
Howlett, Samuel .. .. 4, Lindley Street, Mile End, E.
Hughes, John .. .. 3, West Street, Finsbury Circus, E.C.
Hughes, Thos... .. .. Red House, Llandilo.
Hugill, John .. .... 14, Miles Lane, E.C.
Ince, Joseph .. .. .. 11, St. Stephen's Avenue, W.
Jackson, Geo. .. .. .. 870, Rochdale Road, Manchester.
Johnson, Thos. J. .. .. 35, Middle Hillgate, Stockport.
Jones, William.. .. .. 13, Upper Baker Street, N.W.
Jones, W. Harris .. .. 4, Maclise Road, W.
Jones, Wm. Hy. ... ... 406, Caledonian Road, N.
Kay, Samuel .. .. .. 7, Lower Hillgate, Stockport.
Kay, Thomas .. .. .. 7, Lower Hillgate, Stockport.
Kemp, David Skinner ... 27, Coverdale Rd., Shepherd's Bush, W.
Kingsford, Fredk. .. .. 54, Piccadilly, W.
Kinninmont, Alexander 69, South Portland Street, Glasgow.
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Robinson, R. A. .. .. 195, Brompton Road, S.W.
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Sandford, Geo. Webb .. 47, Piccadilly, W.
Sanger, Chas. .. .. .. 489, Oxford Street, W.
Sargent, Jno. Chas... .. 5, Fore Street, Taunton.
Savory, Arthur L. .. .. 143, New Bond Street, W.
Savory, John F. .. .. 29, Lilyville Road, Fulham, S.W.
Schacht, Geo. Fredk. .. 52, Royal York Crescent, Clifton.
Sharp, Benjamin .. .. Brook Villa, Batheaston, Bath.
Silverlock, H. .. .. .. 92, Blackfriars Road, S.E.
Simpson, Hy. D. .. .. Louth, Lincs.
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Smith, John Henry .. 227, Commercial Road, E.
Smith, Samuel .. .. .. 132, Borough, S.E.
Smith, Thomas.. .. .. Heriot Hill House, Edinburgh.
Southall, Alfred .. .. 17, Bull Street, Birmingham.
Sowray, Joseph .. .. 57, Petergate, York.
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Spokes, Sir Peter .. .. 25, Chester Ter., Regent's Park, N.W.
Squire, Alfred H. .. .. 413, Oxford Street, W.
Squire, Peter Wyatt .. 413, Oxford Street, W.
Stacey, Peter .. .. .. High Street, Teddington.
Stacey, Samuel Lloyd .. 300, Holborn, W.C.
Stamp, Edwd. B. .. .. 29, High Street, Hampstead, N.W.
Stone, Fred. W. .. .. 166, Fore Street, Exeter.
Storrar, David .. .. Kirkcaldy, N.B.
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Sutton, Francis .. ... Bank Plain, Norwich.
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"That, having regard to the past services of Mr. J. G. F. RICHARDSON as a Member of the Council of the Pharmaceutical Society, and to the warm interest he has shown in matters affecting trade and education in the Provinces, the Council of the Leicester and Leicestershire Chemists' Association pledge themselves to use every endeavour to secure his return, and would urge the Members and Associates of the Pharmaceutical Society to give Mr. RICHARDSON their support at the forthcoming election." J. J. EDWARDS, *Hon. Sec.*

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QUOTATIONS ON APPLICATION.

RECENT DONATIONS TO THE MUSEUM.

BY E. M. HOLMES, F.L.S.,
Curator of the Museum of the Pharmaceutical Society.

(*Continued from page* 763.)

Tangkawang Fat or Vegetable Tallow.

The remarkable properties of this important article of commerce were first pointed out in this Journal in 1883; and in 1884 an interesting account of the trees yielding it and of the mode of preparation of the fat was published by H. P. Bakker of Sangau (*Pharm. Journ.*, [3], vol. xv., pp. 407, 428). The trees and fats were then described under their native names only. Since that date excellent herbarium specimens of the Tangkawang trees have been received at the Botanical Gardens at Buitenzorg, and the species have been accurately determined. In a recent *brochure** by Dr. W. Burck, the Assistant Director of the Gardens, botanical descriptions of the Tangkawang trees are given. Several of these prove to be entirely new species. With great liberality, Dr. Burck has kindly forwarded specimens of these plants for the Herbarium of the Pharmaceutical Society, and it therefore appears desirable to place on record in the Journal the diagnostic characters of these species, which are as follows:—

1. *Shorea stenoptera*, Burck.—"Foliis præter costam glabris, e basi late-cordata vel truncata, oblongis vel obovato-oblongis, breviter acuminatis, costulis 14–16; stipulis caducis cicatrices annulares relinquentibus. Calycis fructiferi laciniæ fructu vix vel non longiores."

The ovoid fruit is the largest of any of the Tangkawang trees, being six centimetres long by four broad. The flowers are produced in September and October, and the fruit is ripe in February and March. From the other allied species it differs in the wings of the calyx being not longer than the fruit, and not more than 1½ centimetres broad. It is found in the province of Sintang in North-west Borneo, and is known as the "Tangkawang toengkoel."

2. *Shorea Gysbertsiana*, Burck.—"Foliis præter costam glabris e basi late-cordata oblongis, costulis 15–20; stipulis magnis caulem amplectentibus nonnunquam cito deciduis. Calycis fructiferi laciniæ fructu multi longiores."

The fruit is ovoid acuminate, 5 to 7 centimetres long, but only 2½ broad, and is covered with a dense white down. The wings of the calyx are much longer than the fruit, attaining even a length of 0·15 metre. They are often recurved.

A variety of this species, described by Dr. Burck under the name of *scabra*, differs in the wings of the fruit not being recurved, and in the branches and petioles and the underside of the leaves being covered with tawny stellate hairs. The following is the diagnostic description:—

Shorea Gysbertsiana, var. *scabra*.—"Ramis petiolisque stellato-tomentellis gilvis. Foliis subtus pilis stellatis scabris, in costa et costulis stellato-tomentellis. Stipulis plerumque deciduis; bracteis lanceolatis plurinerviis, glabris, persistentibus. Calycis fructiferi laciniis non recurvatis."

Tangkawang lajar is the native name of the type, and *Tangkawang rambei* and *T. noeron* are not botanically distinct from it. *T. goentjang* is the name given to the variety *scabra*. Between this and the type there are intermediate forms. The fruits of *T. goentjang* are somewhat larger than those of the type. Both these trees occur in the province of Sintang, in N.W. Borneo.

3. *Shorea aptera*, Burck.—"Foliis junioribus stellato-pilosis, glabrescentibus lucidis e basi truncata vel rotundata rariter cordata, oblongis, obtuse acuminatis, costulis 16–20; stipulis caducis cicatrices parvos non-annulares relinquentibus. Calycis fructiferi laciniis brevibus fructum non vel vix superantibus."

This tree is distinguished by its smaller fruits having the calyx wings scarcely exceeding the fruit.

The fruits are ovoid acuminate, and only 2½ to 3 centimetres long. The fat obtained from them is of a yellowish tinge, is softer than that of the previous species and is not considered good to eat. *Tangkawang Madjau*, *T. Saloensoeng* and *T. Soenkasoewoe* are the native names of this tree. It grows in the provinces of Sintang and Sambas, in West Borneo.

4. *Shorea scaberrima*, Burck.—"Foliis supra in costa hirsutis junioribus stellato-villosis, subtus papillososcaberrimis e basi rotundata vel truncata oblongis acutis costulis 18–22; stipulis cito caducis lanceolatis v. falcatis; calycis fructiferi laciniis fructu non vel vix longioribus."

The fruit is ovoid, 3–5 centimetres long, and is covered with a silky pubescence.

The fat of this tree, which is known as *Tankawang babie*, is not mentioned by Bakker, but according to Toorop is exported in considerable quantity from the province of Sambas. The fruit, although much smaller, bears a considerable resemblance to that of *S. stenoptera*.

The name of *Tangkawang babie* appears to be also applied to another new species named *S. compressa*, Burck, but of which the fruit is not yet known, and which Dr. Burck proposes to describe in a forthcoming revision on the Dipterocarpeæ of the Archipelago, which will appear in the Annales of the Buitenzorg Botanic Garden.

In all the above species, except *S. stenoptera* and *S. aptera*, three of the segments of the calyx are larger and longer than the other two.

5. *Shorea Martiniana*, Scheffer.—"Foliis glabris, subinæquilateris e basi rotundata vel subtruncata ovato-ellipticis, breviter acute-acuminatis, costulis 10–12; stipulis late-triangularibus basi caulem amplectentibus, subbiauriculatis. Calycis fructiferi laciniæ fructu non vel vix longiores."

This tree grows in the western part of the Sambas province in Borneo, and, as well as the next, is known as Tangkawang Pinang. The fruit is 3½ to 4 centimetres long and 2½ broad; ovoid, apiculate, and covered with a whitish down.

6. *Shorea Pinanga*, Scheffer.—"Foliis præter costam glabris, basi inæquilatera obtusa, oblongis costulis utrinque 10–12; stipulis caducis; calycis fructiferi laciniis fructu multo longioribus."

This tree is also a native of the western part of the Sambas province. The fruit is 4 to 4½ centimetres long and 2½ broad; elongate-ovoid and acutely acuminate, and covered with a dense white down. The caducous lanceolate stipules and the very long calyx segments of the fruit distinguish it from *S. Martiniana*. Although the fruit is nearly as large as that of *S. stenoptera* the tree is only about 30 feet high. It has long pendulous branches. A fuller description of the tree may be found in a paper by Scheffer in the *Natuurkundig Tijdschrift voor Nederlandsch Indie*, 1870.

* 'Mededeelingen uit 'slands Plantentuin,' iii., Minjak Tengkawang.

7. *Isoptera Borneensis*, Scheffer.—"Foliis lanceolato-oblongis obtuse acuminatis supra lucidis subtus in nervorum axillis scrobiculatis, pallidis. Calycis fructiferi laciniis rotundatis horizontaliter patentibus."

The fruit is small, sub-globose, with an acuminate apex, about the size of a marble, and the wings of the fruit are equal in size, rounded and spread horizontally. The trees begin to fruit when about six years old. The fat has rather a higher melting point than that of the other species. This is stated by Professor Eykman to be 36·5° C.

The tree is known as *Tangkawang terindak*.

For details concerning the fats of the above trees the reader is referred to the above-quoted article by Mynheer Bakker.

Fats derived from Sapotaceous Plants in Sumatra and the neighbouring islands.

Among the specimens recently presented to the Museum of the Society are a series of the Sapotaceous plants yielding vegetable fats in Sumatra and Borneo, etc. Although the produce of several of these trees is well known in the East, and finds a ready market at Singapore, they are still almost unknown in this country. Several of the trees also yield gutta-percha. Dr. Burck has given descriptions of the plants in his 'Mededeelingen uit 'slands Plantentuin' (No. III., pp. 36–43), from which the following account is taken. The majority of them are species new to science. They are as follows:—

1. *Palaquium Pisang*, Burck.—"Foliis obovatis ellipticis, subtus aureo-nitentibus, costulis 12–14; petiolis 1·5 to 2 per cent. aureo-pubescentibus."

This tree grows to a height of 60 to 80 feet, and yields an inferior gutta-percha which was formerly used to mix with gutta-soentei, but is not now collected. The seed is sub-globose, 1½ centimetres long, with a polished testa. It yields the fat called "Balam."

2. *Palaquium oleosum*, Burck.—"Foliis obovato-ellipticis vel elliptico-lanceolatis subtus aureo-pubescentibus ; costulis 20–22 teneris prominulis."

The fat is distinguished by the name of Soentei fat.

It is a somewhat smaller tree than the last, attaining a height of only 50 to 60 feet, but it yields a valuable timber of a reddish colour, that of *P. Pisang* being white and not durable. The seed is 3 centimetres long, and 2 broad, with a large hilum covering the greater part of the seed. Both the trees grow in Sumatra in damp bushy places near the coast, at an elevation very little above the level of the sea.

The seeds of both species are sometimes eaten in times of scarcity, but the greatest part is exported to Singapore, the collection forming no inconsiderable source of income to the natives, as may be gathered from the fact that between November, 1884, and March, 1885, no less than 600 kojangs* of Balam and Soentei kernels were exported from Sumatra, the former being valued at 80 to 100 dollars per kojang, and the latter 60 to 73 dollars, the price sometimes rising to 120 and 100 dollars respectively. The Balam fat is of a yellowish colour, and has a slightly bitter taste; it is as pliable as wax. It is used in sugar refining, artificial flower making and in the preparation of tapioca, being employed to grease the pans (heated to 300°) in which the tapioca is dried. By far the greatest quantity, however, is exported to Europe *viâ* Singapore.

The Soentei fat is of a pure white colour, has a sweetish taste, and is used by the natives for cooking purposes. By the rough process of extraction used a good deal of the fat is left behind, so that 34 to 36 per cent. only of Balam, and 28 to 30 of Soentei fat is obtained. By the European method employed at Singapore, probably 45 per cent. could be obtained from the balam, and 37 from the soentei fruits. The price varies from 7 to 15 dollars per picul in the European market. The industry is probably capable of considerable extension, since the trees will most likely be found in districts where the value of the fat is not known at present. Both the Balam and Soentei fats are known at Singapore as the vegetable tallow of Siak.

3. *Palaquium oblongifolium*, Burck* (*Dichopsis oblongifolia*, Burck, 'Rapport Gutta Percha,' 1884, p. 21).—"Folia petiolata oblonga v. lanceolata oblonga, longe acuminata, nervis lateralibus 20–30 utrinque in folii substantiam immersis."

The tree is found in Borneo, Sumatra, Riouw and Malacca. According to Mynheer Toorop the fat is prized in the Sambas province more than any other fat for cooking purposes, and is even used as butter. It is prepared almost exclusively for home use, and consequently is not quoted in the Singapore trade reports.

This tree is considered by Dr. Burck to be distinct in the form of the leaves and the size and form of the flowers from *P. Gutta*, the species from which gutta percha was originally obtained, and which, with the exception of a tree cultivated at Singapore, and those cultivated in Java, is believed by Dr. Burck to be now extinct, at least in a wild state (*Annales*, *l. c.*, p. 69).

According to Dr. D. de Loos,† it is a hard white fat consisting principally of stearin and olein, and should be very valuable for the preparation of stearin candles. This tree in Borneo, Sumatra and Riouw is the source of the best gutta-percha, and is now planted by the Dutch Government on this account in the Tjitjoeroeg district. It should receive attention at the hands of the British Government, since not only does it yield the best known gutta-percha and a valuable fat from the seeds, but also useful timber.

4. *Payena lancifolia*, Burck.—"Foliis longiter petiolatis e basi acuto-lanceolatis acuminatis, 1–1½ pedaliis, supra glabris, subtus aureo-nitentibus."

The tree grows in marshy land, especially on the banks of the smaller rivers, and the fat is used in the Sintang province of N. Borneo in the same manner as that of *P. oblongifolium* in the Sambas district. The fat at the ordinary temperature of the tropics is a clear fluid, and for kitchen purposes it is not so much esteemed as the Tangkawang fat. It is called by the natives "Kelakki" fat; it is not as yet exported. The wood of the tree is used for making oars.

5. *Payena* (?) *multilineata*, Burck.—"Foliis lanceolatis longiter-acuminatis glabris, subtus pallidis costulis subtilibus densissimis plusquam 60."

This tree grows in the same district as the last,

* At Singapore a kojang consists of 40 piculs (of 133⅓ lbs.), and in various parts of the Dutch East Indies from 27 to 30 piculs.

* See "Sapotacées des Indes Néerlandaises," in 'Ann. du Jard. Bot. de Buitenzorg,' vol. v., p. 25, tab. 5.

† 'Beschrijvende Catalogus van het Kolonial Museum te Haarlem,' vol. ii., pt. i., p. 10. 1884.

and yields an inferior fat, which is only used for lighting purposes. Neither flowers nor fruit have yet been seen, and the tree is therefore referred doubtfully to the genus *Payena*. The native name for the tree is "*Belaban*" *or* "*Melaban*."

6. *Payena Bankensis*, Burck.—"Folia e basi acuta v. subacuta lanceolata, acute acuminata vel apice rotundata glabra, subtus pallida fuscescentia, nervis secundariis circiter 30 utrinque prope marginem arcuatim unitis pertensa ('Ann. du Jardin Bot. de Buitenzorg,' vol. v., p. 54).

The fat of this tree is at the usual temperature in Java a thick fluid; according to Dr. D. de Loos (*loc. cit.*, p. 9) it agrees in colour and purity with almond oil, and is usually soft, and light green in colour. In Sambas province the fat is known as "Tengkawang sangai," but in Banka as "Ketiauw" oil. It does not appear to be exported. The tree affords a gutta-percha of inferior quality, known as gutta katijau or ketiauw.

7. *Payena latifolia*, Burck (*l.c.*, p. 58, t. ix.)—"Folia e basi acuta ovalia acuminata, nervis secundariis prominulis circiter 20 utrinque. Florum fasciculi axillares multiflori."

This tree is a native of Billiton and Riouw; it yields an oil called "*Minjak Bengkoe*." The oil, according to Dr. D. de Loos, is clear, of a yellow colour and a pleasant taste. It has an odour of bitter almonds, and at 4° is perfectly solid. It is insoluble in alcohol, but miscible with fats; is soluble in benzol, and is not a drying oil. In Riouw Archipelago it is used in the preparation of pastry (*Natuurkundig Tijdschrift v. Nederlandisch Indie*, 1862, pt. xxiv., p. 481).

8. *Payena macrophylla*, Burck (*Kakosmanthus macrophyllus*, Hassk.)—"Folia breviter petiolata e basi rotundata vel subcordata oblongo-obovata apice rotundato-obtusa vel breviter acuminata, $1\frac{3}{4}$ pedalia supra glabra lucida, subtus argenteo-sericea. Stipulæ triangulares acuminatæ pubescentes 5 mill. longæ deciduæ."

This tree is a native of the province of Bantam; the oil of the seeds is used for various purposes, W. H. de Vriese, 'Tuinbouwflora' (iii., p. 229, and *l. c.*, p. 51).

9. *Diploknema sebifera*, Pierre (*Archives Néerlandaises*, tom xix., p. 104, pl. iv.).—"Ramuli crassi folia ad apices ramulorum conferta, alterna. Flores polygamo-dioici numerosi ad axillas defoliatas vetustioresque umbellati pedunculi breves ferruginei tomentosi."

The tree was collected at Barabay, in Borneo. The fat is obtained by boiling the seeds. It forms the Minjak Tangkawang of Bandjermassing. Dr. Pierre thinks the tree worth cultivating. The genus *Diploknema* was erected by Dr. Pierre on account of certain differences in the structures of the flowers of the present species, by which it is separated both from *Bassia* and *Payena*. From the former it differs in the short corolla tube, in the stamens being in an indistinct series or scattered, in the hypogynous pulvinate disk, and in the style not being elongated, and from *Payena* in the venation of the leaves, inflorescence, style, and ovary; and from both in the number of sepals and the polygamous flowers, which are of rare occurrence in the Sapotaceæ.

Of all the above Sapotaceæ the Balam and Soentei trees of the east coast of Sumatra seem the most worthy of attention as objects of culture, more especially as the fats have already found uses in European industries. While it is possible some of the other Sapotaceous fats may possess equally valuable properties, there is always great difficuly in introducing unknown and untried products. Thus the Bengkoe oil of Riouw and Billiton, and the Minjak Tangkallah* (*Cylicodaphne sebifera*) of West Java and Banka, have as yet found no entrance into commerce, in spite of strong recommendations.

A NOTE ON SPURIOUS CHIRETTA.

BY WILLIAM ELBORNE,

Assistant Lecturer in Materia Medica and Pharmacy in The Owens College, Manchester.

In January last I received from Messrs. J. Woolley, Sons and Co., of this city, two bundles taken from a parcel of chiretta purchased in London at that time, with the information that the quantity bought contained at least 30 per cent. of the same.

Upon carefully examining the bundles in question I had no difficulty in identifying a portion as the false chiretta described by Professor Bentley† (*Ophelia angustifolia*, Grisebach); the remainder, however, presented a marked difference, inasmuch as it contained a well-developed pith, similar to the official variety, although from its want of bitterness it was evidently spurious. It therefore occurred to me that this latter kind, possessing very much the character described by Bentley (with the exception of the absence of pith) might probably be yielded by a different species.

Upon investigating the matter I find that a writer in "The Month," of April, 1877, appears also to have met with a chiretta free from bitterness, possessing at the same time the well-developed pith of the genuine variety. The British Museum authorities, to whom I submitted for identification the sample in question, have referred it to *Ophelia alata*, Grisebach.

NOTE ON FALSE STROPHANTHUS SEED.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

At a recent Evening Meeting of the Pharmaceutical Society, some false strophanthus seeds were shown, which were then doubtfully referred to *Holarrhena africana*. Since then the perfect seeds have been forwarded to me by Messrs. T. Christy and Co., so that it has been possible to identify the species. The seeds present an appearance as if the hairs of the awn of the seed were bent backwards. On careful examination, however, under a lens, it became evident that the seed itself was entire, and presented no point of attachment. On examining the end of the apparent awn, it was observed to present the appearance of having been broken off. It was obvious therefore, that the apparent awn was really the hairy pedicel or funiculus of the seed. This curious feature is alluded to in Bentham's description of the genus in the words "*Semina elongata apice ecomosa, basi aristam longissimam longissime retrorsum plumosam comam simulantem producta.*"

On cutting the seeds across, the cotyledous were found to be irregularly folded or contortuplicate. These features indicate the genus *Kickxia*, of which only three species appear to be known:—*K. africana*, Benth., which has been found on the bank of the

* See *Pharm. Journ.*, [3], xiv., p. 481.

† *Pharm. Journ.*, [3], vol. v., p. 481 (1874).

Bagroo River, flowering in April, at Fernando Po, and at Bonny in open low country. This is the only known African species, and there can be hardly a doubt that the seeds in question belong to this species. The other two species are natives of the Philippines (*K. Blancoi*, Rolfe*) and Java (*K. arborea*, Bl.). Both of these have fewer, but much larger flowers on longer pedicels, the corolla being about two inches across, and furnished with a pedicel about one inch long. The leaves of *K. arborea* are ovate, like those of *K. africana*, but those of *K. Blancoi* are smaller and lanceolate.

The distinctive characters of *K. africana* as given in the 'Icones Plantarum' (vol. xiii., pl. 1276), are as follows :—

"*Cymis densis multifloris, pedicellis brevibus, glandulis calycinis in squamellas subconnatis, antheræ dorso non incrassatæ.*"

I learn from Mr. Christy that the seeds have been examined by Professor Birch, who has established definitely that they contain a toxic substance which he believes to be an alkaloid and not a glucoside. Professor Kickx, after whom the genus and *Coprolepa Kickxii* are named, was the Director of the Botanic Garden of Ghent, and President of the Botanical Society of Belgium, and died quite recently (March 29, 1887).

PERSIAN OPIUM.†

Amongst articles of export from Persia, opium occupies the chief place. The yearly crop in and around Ispahan may be estimated now at about 40,000 shahmans, equal to about 232 tons; and the planting of opium and its getting in gives occupation to a very great part of the population. The poppies are not cut before the beginning of June, and the juice is then brought to the market in copper vessels. As a rule, opium changes hands twice, and even oftener, before it comes into the hands of the exporter, and varies very much in quality, according to the soil in which it is grown—one of the most renowned districts being the village of Kupa, at a short distance east of Ispahan. London and Hong Kong are the chief customers, and the merchants prepare it according to the wants of those markets. Of late years the planting of opium has more and more encroached on the grounds available for cultivation, owing to its yielding heavier profits to the cultivator than corn and other cereals. The quality of Ispahan opium is now much appreciated in foreign markets, and more attention is being paid to its preparation than formerly. We may take the annual exportation now to be about 2500 cases of 10 to 11 shahmans each, which, at an average price of 200 tomans, gives the respectable total of 500,000 tomans, about £170,000. Of course prices vary very much, according to supply and demand. Last year the average price was about 21 tomans, (nearly £7) for 1 shahman (13 lbs.) of prepared opium, whereas at the beginning of this year the price was 17 tomans (£5 10*s*) for 1 shahman (13 lbs.), and now has risen to 19 tomans. The fluctuations in the prices are occasionally enormous. In one particular season (two or three years ago) prices rose from 17 to 25 tomans for the prepared drug, which means about 9 to 13 tomans in the raw or unprepared state. Persian opium now competes successfully with other descriptions (Turkey, Asia Minor, etc.) in London and Hong Kong, and it is a source of great wealth to this part of Persia. From Ispahan opium is also sent to Shiraz and Yezd, where it is mixed with the native drug grown in those parts, and thence exported to India and China. About a quarter of the Ispahan opium is exported by English firms.

* *Journ. Linn. Soc.*, xxi., p. 313.

† From a report by Mr. Herbert, on the Trade and Industries of Persia.

ANNUAL REPORT OF THE COUNCIL,

To be presented at the Forty-sixth Annual General Meeting of the Pharmaceutical Society of Great Britain.

In presenting the Forty-Sixth Annual Report the Council has once more the pleasure of recording the continued satisfactory financial position of the Society.

In conformity with the practice of the Council to assist well organized local efforts for providing pharmaceutical education in the provinces, a grant of £25 was made during the year to each of the three following Associations—The Sheffield Pharmaceutical and Chemical Society, the Leeds Chemists' Association, and the Leicester and Leicestershire Chemists' Association. During the present year, and, therefore, since the period covered by the Financial Statement, a sum of £50 has been voted to the Aberdeen and North of Scotland Society of Chemists and Druggists.

The number of candidates during the year 1886 for the Major examination was 98, as compared with 100 in 1885. The number of candidates for the Minor examination was 1070, and for the Preliminary 1305—showing an increase of 115 and 31 respectively. Sixty-seven certificates were received in lieu of the Preliminary examination. The large number of failures is still an unsatisfactory feature of the examinations, and the numerous failures especially in Arithmetic in the Preliminary examination has formed the subject of special comment by the College of Preceptors, by whom this examination is conducted on behalf of the Society. The Reports for 1885 and 1886 of Dr. Greenhow, the Visitor on behalf of the Privy Council, have been received from that Department, and have been published in the Society's Journal and Transactions.

The amount received on the Journal account for advertisements and sales has been nearly sufficient to meet the expenses of its production, notwithstanding the increasingly large number of copies distributed gratuitously to various public institutions at home and abroad, and local pharmaceutical associations, as well as to the Members, Associates and Apprentices of the Society.

Nearly three hundred volumes and pamphlets have, during the past year, been added by gift and purchase to the Society's Libraries in London and Edinburgh. Of this number about two-thirds consist of new works or new editions, and the remainder are bound volumes of periodicals. The total number of books in both Libraries is now nearly 11,000.

Many large and valuable donations have been made to the Society's Museum in London during the past year through the liberality of the Commissioners of the Colonial and Indian Exhibition, and of several of the exhibitors, some of whom have handed over their entire exhibits. Numerous donations have also been received both from wholesale firms and

private individuals, at home and abroad, to all of whom the Society is much indebted. A valuable series of the gutta percha and fat yielding plants of Borneo and Sumatra have been received from the Botanical Gardens in Java through the kindness of Dr. Burck, accompanied by a complete set of the Ledgeriana barks cultivated in Java. The Herbarium has been enlarged by the addition of about 150 medicinal plants from Mauritius, presented by the Director of Woods and Forests in that Island. Mr. J. W. White, of Clifton, has also presented a second series of 150 specimens for the Herbarium of British plants. The number and importance of the donations have not been exceeded in any previous year. Some of the specimens have been placed in the Society's Museum in Edinburgh, which has been also enriched by gifts from persons interested in the welfare of the Society.

Your Council has the pleasure of recording that a medallion of the late Daniel Hanbury, F.R.S., by Thomas Woolner, R.A., has been presented to the Society by Mr. Thomas Hanbury, and has been placed in the Materia Medica Museum.

The inaugural sessional address in October, was delivered by Sir Henry W. Acland, K.C.B., M.D., F.R.S., President of the Medical Council, now an Honorary Member of the Society.

A series of six lectures on "Galenic Pharmacy" was kindly delivered by Emeritus-Professor Redwood last year.

The Evening Meetings in London and Edinburgh have been well attended, and valuable papers have been read, giving rise to interesting discussions.

During the year upwards of one hundred and fifty cases of infringement of the Pharmacy Acts were reported to the Registrar and dealt with. In thirty-two cases legal proceedings were taken in order to obtain compliance with the law.

In its last report the Council stated that an endeavour was being made to ascertain if a modification of the proposed Bye-Laws would be confirmed by the Privy Council, and it was ascertained that the Department was of opinion that the proposed alterations were not within the powers conferred by the existing Pharmacy Acts. It was, therefore, decided to introduce a Bill into Parliament to obtain the necessary powers, and, under the charge of the Earl of Milltown, it has been carried through the House of Lords. The Bill has passed the first and second readings in the House of Commons, and is awaiting the Committee stage.

The Early Closing Bill has received the consideration of the Council, and steps have been taken to procure the exemption of chemists and druggists from the operation of the Bill.

The ground lease of the premises, 15 and 16, Bloomsbury Square, and of a piece of land in the rear, has been secured; a contract for building premises on the latter has been entered into, and the work is now well advanced. It is intended that the accommodation in the new building shall consist of an Examination Hall, Laboratory and Dispensary, to be used for the purpose of conducting the Society's examinations; and other Laboratories for Chemical and Pharmaceutical research work, and for such other purposes as may be found necessary.

Your Council refers with satisfaction to the arrangements that have been made for the conduct of the Society's business in Scotland, and looks forward with confidence to receive much valuable assistance from the newly-constituted Executive of the North British Branch of the Society, which has presented its first report to the Council.

As compared with the previous year there is a small decrease in the income from subscriptions to the Benevolent Fund, although the expenditure both for annuities and temporary assistance has been larger. Your Council hopes that as a result of the Dinner to be held on the 17th of May at the Freemasons' Tavern in aid of the Fund a substantial sum will be realised, not only in donations, but in new annual subscriptions, since it is by the latter the Council is enabled to expend so large a sum annually in excess of the income arising from investments.

In the last Annual Report, reference was made to a movement that had been initiated by the friends and former pupils of Emeritus-Professor Redwood to found a Scholarship in connection with the Society's School, to be called the Redwood Scholarship. Out of the amount contributed, the sum of £604 2*s.* 6*d.* has been expended in the purchase of Great Indian Peninsula Railway Stock, and a Deed of Trust has been executed vesting the property in the Council of the Society, which is entrusted with the duty of laying down the conditions under which the Scholarship shall be awarded. In addition, a portrait of the Professor has been painted by Mr. Sydney Hodges, which will be presented to the Society by the Testimonial Committee on Wednesday, the 18th of May, after the business of the Annual Meeting, and it is intended that a replica of the picture shall be given to the Professor.

Your President received in February last from Sir Frederick Abel, a communication intimating a hope entertained by H.R.H. The Prince of Wales, that the members of the Society would take part in the foundation of the Imperial Institute, which it is proposed to establish in commemoration of the fiftieth year of the Queen's reign. The communication having been submitted to the Council, it was decided to bring the subject under the notice of the members and associates in business, with the result that, up to the present time, a sum amounting to £160 has been received and forwarded to the Organizing Secretary of the Institute.

The following have been elected to fill the vacancies in the list of Honorary Members:—Sir Henry Acland, K.C.B., M.D., F.R.S., Oxford: Joseph Bosisto, C.M.G., Melbourne; Christian Brunnengräber, Ph.D., Rostock; Thomas Lauder Brunton, M.D., F.R.S., London; Professor A. De Bary, Strassburg; W. T. Thiselton Dyer, C.M.G., F.R.S., Kew; Professor Thomas Fraser, M.D., F.R.S., Edinburgh; Professor A. Ladenburg, Ph.D., Kiel; Professor John Maisch, Philadelphia; C. Méhu, M.D., Paris; Professor Louis Pasteur, Member of the Institute of France, F.R.S., Paris; Anton v. Waldheim, Vienna.

Your Council regrets to have to record many losses by death during the past year: amongst them, Dr. Frederic John Farre and Dr. Louis Mialhe, Honorary Members of the Society; William Southall, of Birmingham, for many years a member of the Board of Examiners for England and Wales; James Baynes, of Hull, a former member of Council; and the following Local Secretaries:—William Cartwright, of Newcastle-under-Lyme, and Henry Davis, of Leamington.

Receipts. GENERAL FUND—FINANCIAL

	£ s. d.	£ s. d.
Balance January 1st, 1886:—In Treasurer's hands	1564 19 0	
In Secretary's hands	138 0 0	
In Honorary Treasurer's hands (Scotland)	31 15 2	
		1734 14 2
Life Members' Fund:—Interest		87 0 0
Interest on Investments		703 7 9
Subscriptions:—1542 Members, Pharmaceutical Chemists	1619 2 0	
692 „ Chemists and Druggists	726 12 0	
1281 Associates in Business	1345 1 0	
899 Associates not in Business	471 19 6	
1194 Apprentices or Students	626 17 0	
6 Entrance Fees	12 12 0	
	4802 3 6	
Fees paid upon restoration to the Society	20 9 6	
		4822 13 0
Examination Fees:—1403 Preliminary Examination	2511 18 0	
3 Modified „	3 3 0	
1087 Minor „	2903 2 0	
97 Major „	414 15 0	
		5832 18 0
Registration Fees:—19 Fees for Restoration to the Register	19 19 0	
10 Registration Fees as Chemists and Druggists	52 10 0	
		72 9 0
Journal:—Advertisements	4368 6 4	
Sales	427 3 4	
		4795 9 8
Register:—Sales to the Government	147 10 0	
Sundry Sales	8 5 0	
		155 15 0
Calendar:—Sundry Sales		14 18 0
Penalties and Costs for infringements of the Pharmacy Act		183 13 6
Rent of Stable in rear of Society's House, Edinburgh		9 19 6

£18,412 17 7

STATEMENT FOR 1886.

Expenditure.

	£ s. d	£ s. d
Annuities:—Professor Redwood		100 0 0
Mr. Elias Bremridge		400 0 0
Carriage of Books, and other Parcels		10 16 7
Certificates of Death		21 6 5
Conversazione at South Kensington Museum	255 8 5	
Evening and other Meetings	61 12 11	
		317 1 4
Examiners, Boards of—	*England and Wales.* / *Scotland.*	
Fees to Examiners	1530 18 0 / 491 8 0	
Fees to Superintendents—Preliminary Examination	207 18 0 / 31 10 0	
Hire of rooms for conducting Preliminary Examination	65 10 6 / 7 3 11	
Travelling Expenses	271 1 3 / 29 18 2	
Refreshments for Examiners	96 6 4 / 17 16 11	
Apparatus, Drugs, and Chemicals for Examinations and sundry charges in connection therewith	89 3 11 / 25 18 8	
	2260 18 0 / 603 15 8	
(*England and Wales*)	2260 18 0	
	2864 13 8	
Fees to the College of Preceptors	170 6 0	
		3034 19 8
Fixtures and Fittings		6 11 9
Furniture		1 14 6
Grants in aid of provincial education		75 0 0
House Expenses:—Gas, Water, Coal, Cleaning Materials, &c.		247 6 11
Journal:—Editor and Sub-Editor's Salaries	677 1 8	
Paper	1026 12 4	
Printing	2179 2 8	
Publishers' Commission	549 2 4	
Contributions (£351 2*s.* 8*d.*) and Engraving (£4 17*s.* 0*d.*)	355 19 8	
Reporting	80 2 0	
Attending Conference and other Meetings	25 3 0	
Parliamentary Papers and Sundry Charges	34 2 6	
		4927 6 2
Lectures:—Emeritus Professor of Chemistry and Pharmacy	100 0 0	
Professor of Botany and Materia Medica—Endowment of Chair	150 0 0	
Professor of Chemistry—Endowment of Chair	150 0 0	
Subscription to Royal Botanic Gardens	21 0 0	
Laboratory:—Professor of Practical Chemistry—Endowment of Chair	150 0 0	
	571 0 0	
Apparatus and Materials for Pharmacy Classes, Prize Medals, Certificates, &c.	41 18 3	
Printing and posting prospectuses	11 4 0	
		624 2 3
Law Costs		408 16 8
Library:—Librarian's Salary	230 0 0	
Purchase and Binding of Books	109 6 4	
		339 6 4
Museum:—Curator's Salary	300 0 0	
Assistant's Salary	91 0 0	
Specimens, Bottles and Sundries	110 4 7	
		501 4 7
Expenses in Scotland:—Assistant Secretary—Salary	156 5 0	
Taxes and Insurance	37 12 3	
Miscellaneous Expenses	106 19 10	
Alterations and enlargement of Stable in rear of Society's House, Edinburgh	147 2 9	
Fitting Bookcases in Library	37 12 4	
		485 12 2
Postage:—General	265 7 10	
Journal (Cost of transmission to Members, Associates and Apprentices)	744 16 10	
		1010 4 8
Register, Printing and Publication		163 5 3
Repairs and Alterations		288 0 2
Rent, Taxes, and Insurance of Plate Glass		396 3 6
Returned Subscriptions to Associates		15 4 6
Stationery, Engraving, Printing, and Office Expenses	234 4 8	
Society's Calendar	117 0 0	
		351 4 8
Salaries:—Secretary and Registrar	450 0 0	
Clerks and Servants	865 12 0	
		1315 12 0
Grant towards Laboratory expenses for Research Work (Professor Dunstan)		50 0 0
Cost of Materials supplied to the Jacob Bell Scholars		10 0 0
Herbarium and Council Medals		7 17 6
Secretary's Expenses attending Conference at Birmingham		4 1 0
Sundries		8 3 6
New Premises, Pied Bull Yard, Purchase Old Materials, etc.		26 3 8
Travelling Expenses:—Members of Council	401 6 6	
Deputation of Scottish Members to the Council	23 5 9	
		424 12 3
Refreshments for Council		42 13 4
Investment:—Purchase of £1500 2½ per Cents.		1331 5 0
Balance, December 31st, 1886:—In Treasurer's hands	1327 14 11	
In Secretary's hands	2 6 9	
In Honorary Treasurer's hands (Scotland)	136 16 7	
		1466 18 3
		£18,112 17 7

BENEVOLENT FUND 1886.

Receipts.

	£	s.	d.	£	s.	d.
Balance in Treasurer's hands, Jan. 1st, 1886				110	17	9
Balance in Secretary's hands, Jan. 1st, 1886				7	1	3
London and Westminster Bank, Jan. 1st, 1886				500	0	0
Interest on Invested Capital and Ground Rents				781	14	2
Subscriptions				1451	16	11
Donations	34	13	0			
Legacies	140	0	0			
				174	13	0
Part of a Grant returned				0	14	0
				£3,026	17	1

Expenditure.

	£	s.	d.	£	s.	d.
37 Annuitants at £35 per annum	1295	0	0			
7 Ditto at £30 ditto	210	0	0			
1 Ditto { 1 quarter @ £30	7	10	0			
1 Ditto { 3 quarters @ £35	26	5	0			
1 Ditto { 2 quarters @ £30	15	0	0			
1 Ditto { 2 quarter @ £35	17	10	0			
1 Ditto (deceased), 3 quarters at £35 per annum	26	5	0			
				1597	10	0
Casual Grants.						
Members of the Society and Registered Chemists and Druggists (19)	155	0	0			
Widows of ditto (44)	451	14	5			
Orphans of ditto (2)	25	0	0			
				631	14	5
Payment from the Robbins Fund				5	0	0
Printing and Stationery, etc.	27	2	6			
Postage	18	0	1			
				45	2	7
Surveyors' charges in connection with the selection of suitable Ground Rents				15	13	0
Investments :—						
Purchase of £500 Consols				503	15	0
Balance in Treasurer's hands, Dec. 31, 1886				216	3	5
Balance in Secretary's hands, Dec. 31, 1886				11	18	8
				£3,026	17	1

We, the undersigned Auditors, have examined the accounts of the Pharmaceutical Society of Great Britain, as presented in the Financial Statement and Benevolent Fund Account, and find them correct. We have inspected the Deeds relating to the Freehold House and Ground Rents named below, and also find that there was standing to the account of the Society at the Bank of England, and in the hands of the Society's Bankers, on the 31st December, 1886, the undermentioned Stocks, viz. :—

		£	s.	d.	£	s.	d.	£	s.	d.
General Fund	New 3 per Cents.	14,925	0	0						
	New 2½ „	5,500	0	0						
	Freehold Ground Rents				20,425	0	0			
	at Paddington Green, London, W., cost.				5,551	5	6			
	Society's House in Edinburgh, cost.				1,931	10	0			
	New 3 per Cents (Life Members' Fund)				3,000	0	0			
								30,907	15	6
Benevolent Fund	Consols				2,500	0	0			
	Freehold Ground Rents at Strawberry Hill, cost.				1,020	12	6			
	Freehold Ground Rents at Battersea, cost.				12,213	0	0			
	Freehold Ground Rents at Broomwood Park Estate, Wandsworth, cost.				5,680	18	4			
								21,414	10	10
do. (Robbins Fund)	Gas Light and Coke Co. 4 % perpetual Debenture Stock.							125	0	0
Secretary's Casual Relief Fund	Consols							105	0	0
Pereira Memorial Fund	Consols							100	0	0
Bell Memorial Fund	Consols							2,050	0	0
Hanbury Memorial Fund	Consols							400	0	0
Hills Prize Fund	Russian Bonds							300	0	0

W. HODGKINSON,
W. K. HOPKIN,
F. HARWOOD LESCHER,
W. MANNING WATTS,
Auditors.

March 22, 1887.

The Pharmaceutical Journal.

SATURDAY, MAY 7, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE ANNUAL REPORT OF THE COUNCIL.

THE period has again arrived at which it is customary to give an official retrospect of the Society's work during the past twelve months, in the form of a Report by the Council for consideration at the Annual Meeting, and we are enabled to place this document before our readers in the present number, as its publication has been ordered by the Council. In many respects the subjects referred to in it merit careful attention as being of more than ordinary importance, while others present little deviation from what has now been the experience of many years. Thus the financial position of the Society is very briefly mentioned, as maintaining the satisfactory condition that has been reported on previous occasions. On this point the auditor's report, together with the financial statement of receipts and expenditure, furnishes more detailed information. This opportunity may be taken to point out certain items of expenditure which have formed a constant feature in the accounts for many years, viz., those relating to the School supported by the Society, and amounting in the past year to upwards of six hundred pounds. A similar outlay has been incurred in previous years, and our reason for referring to this circumstance is that in a circular which has been anonymously sent to members of Parliament to induce them to oppose the Pharmacy Acts Amendment Bill now under consideration, one of the statements made with this object is that since the Pharmaceutical Society has a School of Pharmacy of its own, it would be unfair to other schools for the Council of the Society to have the power of recognizing what schools certificates of attendance are to be received from. It is suggested that if this power were given to the Council it would be unfairly exercised, so that the Society's School might be plentifully supplied with students. The facts that we have referred to above as to the expenditure incurred in supporting the School at Bloomsbury Square sufficiently show that the maintenance of this School is not carried out by the Society as a matter of profit or of competition with other schools, if such exist, but that it is, and has been, a source of continued and considerable expense. As a matter of fact, moreover, the Society has for the last fourteen years had no kind of proprietary interest in the School, and the relation of the Council to it has consisted solely in the exercise of control over the system of instruction pursued there, the endowment of the professorial chairs, and the provision of premises, etc., the expenditure thus incurred amounting generally to several hundred pounds annually. It will be evident, therefore, that the statements put forward in the circular above mentioned are entirely unfounded and contrary to fact, while the suggested inferences to be drawn from those statements would be equally erroneous. The real reason for the continued maintenance of the School by the Society is the feeling entertained by the Council of the necessity for keeping up a standard of efficiency in pharmaceutical education, even at considerable expense, until such time as it may be generally recognized that there must be a stronger inducement to obtain adequate education than is furnished by the existing legal demand of mere examination. The work that has been done by the Society during the last forty-five years in providing for and promoting pharmaceutical education is more justly to be regarded as constituting a high kind of vested interest in the right to have the power of regulating and controlling any institutions that may propose to furnish such education. This work has not been confined altogether to London, but so far as circumstances would permit it has also been carried out in the provinces, and the present statement of expenditure contains an item of grants in aid of education in the provinces. Such grants have been made in former years, but there has always been a serious obstacle to the establishment of any such provision for education in the provinces as would justify the Council in contributing more freely to its promotion. This has been the absence of any compulsory influence which would induce the attendance of students, and for this reason most of the attempts that have been made to establish pharmaceutical schools in the provinces have failed. Nor can it now be expected that such attempts will have any sufficient prospect of success until it shall be made a compulsory regulation that apprentices and pupils shall attend specified courses of instruction. The report of the Council makes mention of several places,—Aberdeen, Leeds, Leicester and Sheffield,—where such attempts are being made with some measure of success even at the present time, and it may be expected that if the Bill now before Parliament passes, schools for pharmaceutical education will become numerous in such provincial centres.

The character of the examination results during the past year has been much the same as before. The number of candidates for the qualifying examination has increased, but the proportion of failures has been at least as high as usual, thus proving most conclusively that many of the candidates have not, during the period of their appren-

ticeship, been educated so as to acquire a competent practical knowledge of the business they propose to carry on. It is evident from this fact, that to a very large extent the apprenticeship system, as at present carried out, does not satisfy the requirements of the case. The sixty per cent. of candidates who fail to pass the examinations is made up of apprentices who have not been taught their business, and in this fact there is abundant proof and justification of the preamble of the Society's Bill that it is expedient to further secure that persons intending to become chemists and druggists should be properly educated while apprentices. The results of the Preliminary examination are no less instructive in the same direction, and the continued large proportion of failures in this simple examination has formed the subject of special comment by the College of Preceptors which conducts this examination, and by Dr. GREENHOW, the Visitor of the Examinations on behalf of the Privy Council. His opinion is that it is most desirable that this examination should be passed before apprenticeship, so that full opportunity may be afforded during the period of technical education for paying proper attention to the subjects which should then occupy the time of apprentices. The candidates now rejected in the Preliminary examination, very often after having completed their apprenticeship, would have been more fairly dealt with if it had been necessary to pass that examination before being apprenticed, for then, as Dr. GREENHOW justly remarks, imperfectly educated youths would have ascertained their incompetence for the business before wasting two or three of the most precious years of their life in endeavouring to obtain admission to a calling for which they are entirely unsuited.

The only other legislative matter in regard to which the Council has taken action during the past year is the Early Closing Bill introduced by Sir JOHN LUBBOCK, and steps have been taken to procure the exemption of chemists and druggists from the operation of this Bill. This course was adopted after due consideration of the conditions under which chemists and druggists are placed with regard to the supply of medicines, and although opinions have been expressed in some quarters in favour of the provisions of the Bill being made applicable to chemists and druggists, we cannot but think that such an interference with their liberty of action, and, in some instances, with the requirements of their business, could prove otherwise than irksome and objectionable in practice.

One important matter referred to in the Report is the satisfactory arrangement that has been made for the conduct of the Society's business in Scotland, which has so entirely done away with the previously existing difficulties between the Council and the Scottish members of the Society that it has been possible, even within the short space of time that has elapsed, for the Executive of the North British Branch to lay before the Council at its last meeting a very satisfactory report of the working of the several departments in Edinburgh. The Evening Meetings have been resumed with marked success, and may be expected to have an important influence in maintaining the repute of the Society with the medical profession and other scientific bodies in Scotland and elsewhere. The various branches of the Society's establishments, both at Bloomsbury Square and in Edinburgh, are mentioned in the Report as showing signs of progress. The Libraries have been augmented by the addition of nearly three hundred volumes and pamphlets. The Museums have received many valuable donations, especially through the liberality of the Commissioners of the Colonial and Indian Exhibition, and several of the exhibitors. Donations have also been received from wholesale firms and private individuals, both at home and abroad, as well as from the authorities of the Botanical Gardens in Java. The Herbarium has been enlarged by contributions of about one hundred and fifty medicinal plants from Mauritius, and of a large series of British plants. The increasing demands for space for carrying on the business of the Society have induced the Council to make provision for additional accommodation by building upon a piece of ground at the rear of the present premises. A spacious Examination Hall with a chemical laboratory and dispensing room are in course of construction there for the use of the Board of Examiners, and there will also be accommodation for other purposes.

RETIREMENT OF PROFESSOR BENTLEY.

THE announcement made by the President at the late meeting of the Council that Professor BENTLEY contemplates resigning the active position he has now occupied for so many years in connection with the direct educational work of the Society will, we are confident, be received with very general regret. Not only among the present and past students, who have attended the Professor's botanical classes, will this be the case, but with all who are connected with the Society, and more especially by that smaller number of individuals who can look back to the time when ROBERT BENTLEY was a fellow-student with themselves in the early days of the Society's career. The Calendar of the Society marks the year 1842 as that in which the single prize then awarded was taken by him, and the year 1849 as that in which he succeeded the late Professor ANTHONY TODD THOMSON in the chair of Botany. Subsequently, on the retirement of Dr. PEREIRA, the lectureship of Materia Medica was also confided to Professor BENTLEY, and from that time he has continued to perform the duties of these combined offices. The fact of Professor BENTLEY having been originally a student in the Society's School serves in a marked manner to remind us that the Society is beginning to have a history somewhat more extended that most of its present members have a personal acquaintance with.

Thus, for instance, even among those who were students in the early days of the Society, there are now but three names of persons remaining on the Register of Pharmaceutical Chemists whose certificates of having passed the Major examination bear single numbers. To the surviving founders and older members of the Society it must naturally be a source of regret to see that after the lapse of so many years the leading object they had in view when the Society was formed—the establishment of a uniform system of education—has not yet been achieved. It is, however, to be hoped that this deficiency may now soon be removed, and that Professor BENTLEY and his colleagues may have the satisfaction of witnessing in that result a successful and beneficial issue of the work which their labours have so largely contributed to promote.

The position and prospects of the Benevolent Fund at the present time were so fully described in a recent number of the Journal that it is unnecessary now to do more than remind our readers, that in pursuance of the intention then mentioned, and in accordance with previous practice, the third Decennial Dinner in aid of the Fund will be held on Tuesday, the 17th inst., at the Freemasons' Tavern, Great Queen Street. The chair will be taken by the President of the Pharmaceutical Society, and from the long list of stewards which is published in the Journal this week it may be anticipated that there will not only be a good attendance on that occasion, but that each of the stewards will be enabled to send in such a list of donations as may provide for the present requirements of the Fund, and leave a substantial surplus for meeting further calls upon it.

* * *

In accordance with the intimation made at the last Evening Meeting of the Pharmaceutical Society in Edinburgh, arrangements have been made for holding another meeting at 36, York Place, on Wednesday evening next, at eight o'clock. The titles of the papers to be read on that occasion are "An Accurate Method for Determining Specific Rotatory Power," by Mr. W. Peddie; "Note on Solubilities," by Mr. D. B. Dott; "A Simple Method of Percolation under Pressure," by Mr. T. Maben; "Irish Moss as a Substitute for Gum Arabic in Pharmacy," by Mr. P. Boa; and "Remarks on Sugars used for Syrups," by Mr. P. Boa.

* * *

Mr. Haydon, the Secretary of the Chemists and Druggists' Trade Association, has forwarded us an advance print of a circular which is about to be issued with the object of ascertaining what possibility there may be of reorganizing the Association on a somewhat different basis. It is proposed to raise the subscription to half a guinea, and to reduce the expenditure by decreasing the number of the Executive and altering the arrangements for the Annual Meeting and report. Members of the Association only are to be defended in cases where defence is practicable, and to have the advantage of legal advice and assistance. If the response to this circular does not warrant the conclusion that there is a sufficiently general and widespread desire on the part of the trade that the Association should continue to exist, a special general meeting will be convened for the purpose of winding it up.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

April 20, 21, 22, 26, 27, 28 and 29, 1887.

Present on the 20*th*, 21*st*, 22*nd* and 26*th*—Mr. Carteighe, President; Mr. Gostling, Vice-President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner, Taylor and Thresh.

Present on the 27*th*, 28*th* and 29*th*—Mr. Gostling, Vice-President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner, Taylor and Thresh.

Dr. Greenhow was present on the 21st and 22nd on behalf of the Privy Council.

MAJOR EXAMINATION.

20*th*.—*Six* candidates were examined. *Three* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Armitage, John Lister .....Mirfield.
Atterbury, Clive .....Burton-on-Trent.
Black, Hugh Milner .....London.

21*st*.—*Six* candidates were examined. *Two* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Goff, Walter Edward .....Birmingham.
Minchin, William.....Bedford.
Palmer, Frank Thomas .....Cheltenham.
Philp, William John Ignatius London.

26*th*.—*Six* candidates were examined. *All* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Beckwith, Arthur Frederick ...Colchester.
Birkett, John .....Stockport.
Blain, William Rushton.....Bolton.
Daintree, Ernest .....Cardiff.
Smith, George... .....Worcester.
Street, Albert Ernest .....London.

27*th*.—*Five* candidates were examined. *All* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Walker, Arthur Heeson .....Altrincham.
Watson, Frederick Percy .....Lincoln.
Watts, Robert .....Sheffield.
Woolley, Samuel Walter.....Stamford.
Wyatt, Harold .....Bootle.

MINOR EXAMINATION.

20*th*.—*Twenty-eight* candidates were examined. *Eighteen* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Allen, Ernest Edward.....Winchester.
Averill, George.....Stafford.
Bancroft, Charles Frederick ...Great Grimsby.
Baugh, Richard .....Carnarvon.
Beard, Albert Edward .....Haddenham.
Berridge, Oliver Gillett .....Leicester.
Blenkinsop, John.....Carlisle.
Bray, Frank Douglas .....Princes Risboro.
Briggs, Thos. Seth Harwood ...Darwen.
Broad, Henry Reynolds .....Kidderminster.

21*st*.—*Twenty-five* candidates were examined. *Thirteen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Allen, Richard .....Ramsey.
Bunn, John Edwin James .....Newent.
Burns, Norman .....Bolton.
Cadge, Chas. Christopher Hume.Alford.
Cairns, Frederic Arthur .....Birkdale.
Carter, Henry Lansdale .....London.
Cowper, Joseph .....Penrith.

Crane, John Hammond .....London.
Cutmore, Frank .. ..Totnes.
Dancy, Ralph .....Turner's Hill.
Davenport, Richd. Cartwright..Talgarth.
Doe, Walter James ....Rochester.

22*nd.*—*Thirty* candidates were examined. *Sixteen* failed. The undermentioned *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Cooper, John Henry .....Loughborough.
Duplock, Walter .....Petersfield.
Edwards, Edward .....Cardiff.
Evans, Harry .....Leicester.
Everingham, Fredc. Adolphus..Market Weighton.
Filmer, John Honeywood .....Devonport.
Ford, William Crossley .....Dudley.
Fox, Frederick William .....Lincoln.
Franklin, John William .....Gloucester.
Fryer, Edwin .....Market Deeping.
Gabbetis, Thomas Holmes .....Etton.
Glover, Arthur Sandon .....London.
Goodwill, William Ernest .....Darlington.
Gratton, George Edwin .....Conway.

26*th.*—*Twenty-eight* candidates were examined. *Fifteen* failed. The undermentioned *thirteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Edwards, Walter .....London.
Griffiths, Thomas.....Carmarthen.
Hamlin, Charles Booth .....Crediton.
Hankinson, Alfred William ...Grange-over-Sands.
Harris, Joseph Bastable.....Totnes.
Hindle, Robert George .....Wirksworth,
Hogg, Vincent Hopkins .....Bideford.
Hooper, William Henry.....Okehampton.
Horsey, Herbert Vaughan .....Southampton.
Hubbard, Henry Joseph.....Norwich.
Jackson, Thomas.....Altrincham.
Jeffery, Elias ....Falmouth.
Keen, Walter Henry .....Red Hill.

27*th.*—*Twenty-eight* candidates were examined. *Nineteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Davis, John .....Nottingham.
Kittow, Tom.....Launceston.
Mallinson, James Edward .....Oxford.
Milbank, Sydney Thomas .....Bishop's Stortford.
Millard, Edgar James .....Derby.
Miner, Major Thomas.....Walsall.
Morris, Edward Stow .....Sleaford.
Park, Frederick .....Tynemouth.
Pattinson, Hedley .....Haltwhistle.

28*th.*—*Twenty-eight* candidates were examined. *Fifteen* failed. The undermentioned *thirteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Jones, Ellis ....Portmadoc.
Morris, Henry Charles .....Tamworth.
Phillips, Benjamin .....St. Clears.
Poole, Weston .....Newcastle, Staffs.
Richmond, Alfred Edward.....Great Yarmouth.
Roe, Edwin John... .....Nottingham.
Rose, George Ernest .....Stratford-on-Avon.
Rutter, Clement Thomas .....Birmingham.
Scott, Richard Forder.....London.
Seely, Charles Leman .....North Walsham.
Sharman, Charles Richard.....Towcester.
Smith, Frederick.....London.
Taylor, Arthur Robert .....Rugby.

29*th.*—*Twenty-nine* candidates were examined. *Fifteen* failed. The undermentioned *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Jones, Eustace Harry.....Dartford.
Smith, Joseph Heury .....Moreton-in-Marsh.
Spanton, John .....Thornton.
Stanley, James.....Bulwell.
Timmis, John .....Silverdale.
Viggars, George Daniel .....Stafford.
Walker, Alfred Ernest .....Mansfield.
West, David Dudley .....London.
Westover, John Turton .....Bridgnorth.
Wildgoose, John Gratton .....Boston.
Wilkinson, George Henry .....Coventry.
Woodland, William.....Selhurst.
Woolley, Edward James.....Manchester.
Wright, John .....Macclesfield.

PRELIMINARY EXAMINATION.

29*th.*—Certificates by approved examining boards were received from the undermentioned in lieu of the Society's examination:—

Belcher, Charles Herbert .....Stafford.
Belcher, James Arthur .....Stafford.
Boreham, Walter Herbert .....Lee.
Burn, David Haitly.....Arbroath.
Coulthard, Wm. Jos. Campbell.Whitehaven.
Davies, Richard .....Kidderminster.
Goode, Chas. Edwd. Adams ...Tunbridge Wells.
Hayward, Walter Edwin .....Pudsey.
Hobbs, Harry .....London.
Islip, Frank .....Dartford.
Kempston, Theodore .....Dublin.
Kendall, George Edward .....Berry Brow.
King, Edwin Harry.....Nottingham.
Mead, Frederick James .....London.
Peers, Thomas Hy. Parkes.....London.
Pérodeau, Edward George .....Plymouth.
Reeve, Walter .....Norwich.
Scott, Joseph Bealey .....London.
Shepherd, James Henry .....Leicester.
Whitmell, John Edward L. ...Watford.
Wiggin, Charles Watkin.....London.

EXAMINATIONS IN EDINBURGH.

April 18, 19, 27, 28 *and* 29, 1887.

Present on the 18*th* and 19*th*—Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Present on the 27*th*, 28*th* and 29*th*—Mr. Carteighe, President; Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Professor Sir Douglas Maclagan was present on each day on behalf of the Privy Council.

MAJOR EXAMINATION.

27*th.*—*Two* candidates were examined. *One* failed. The undermentioned passed, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Auchinachie, Peter .....Keith.

MINOR EXAMINATION.

18*th.*—*Eleven* candidates were examined. *Five* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Alexander, Adam.....Aberdeen.
Andrew, John .....Catrine.
Begg, Arthur .....Bolton.
Bethune, William John .....Forres.
Dougall, Wm. Robt. Braidwood.Aberdeen.
Young, John.....Arbroath.

19*th.*—*Thirteen* candidates were examined. *Nine* failed. The undermentioned *four* passed, and were declared qualified to be registered as Chemists and Druggists:—

Crawford, David .....Rutherglen.
Fatherly, Robert .....Newcastle-on-Tyne.
Gilchrist, Robert ....Glasgow.
Humphrey, John Thurlbeck ...Sunderland.

27*th.*—*Twelve* candidates were examined. *Nine* failed. The undermentioned *three* passed, and were declared qualified to be registered as Chemists and Druggists:—

Jago, Richard Edwin .....Glasgow.
Kerr, James .....Aberdeen.
Mackenzie, James .....Macduff.

28*th.*—*Thirteen* candidates were examined. *Six* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Neil, John.....Glasgow.
Nielson, Walter .....Blackburn.
Pescod, William .....Newcastle-on-Tyne.
Pirie, James Crichton.....Arbroath.
Robertson, George .....Bridge of Allan.
Stephen, Alexander... .....Liverpool.
Stewart, Fergus Ferguson .....Dalkeith.

29*th.*—*Thirteen* candidates were examined. *Four* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Stewart, James .....Kirkintilloch.
Swan, William .....Dundee.
Thomson, John .....Dalbeattie.
Thomson, Marshall .....Banchory Ternan.
Troup, William.....Southport.
Walker, John .....Rothney.
Whaley, Thomas Cope .....Barnsley.
Williamson, Henry .....Bedale.
Wilson, John Grant .....Edinburgh.

PRELIMINARY EXAMINATION.

29*th.*—A certificate by an approved examining board was received from the undermentioned in lieu of the Society's examination:—

Brown, John.....Edinburgh.

MEETING OF THE COUNCIL.

Wednesday, May 4, 1887.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

MR. T. P. GOSTLING, VICE-PRESIDENT.

Messrs. Allen, Atkins, Bottle, Butt, Cross, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Southall, Symes and Williams.

The minutes of the previous meeting were read and confirmed.

Diplomas.

The following, being duly registered as pharmaceutical chemists, were respectively granted a diploma stamped with the seal of the Society:—

Armitage, John Lister.
Atterbury, Clive.
Auchinachie, Peter.
Beckwith, Arthur Frederick.
Birkett, John.
Black, Hugh Milner.
Blain, William Rushton.
Daintree, Ernest.
Goff, Walter Edward.
Minchin, William.
Palmer, Frank Thomas.
Philp, William John Ignatius.
Smith, George.
Street, Albert Ernest.
Walker, Arthur Heeson.
Watson, Frederick Percy.
Watts, Robert.
Woolley, Samuel Walter.
Wyatt, Harold.

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Armitage, John Lister .....London.
Auchinachie, Peter .....Keith.
Beckwith, Arthur F. .....Colchester.
Birkett, John .....Morecambe.
Black, Hugh Milner.....London.
Blain, William Rushton .....Bolton.
Coull, George .....Edinburgh.
Daintree, Ernest .....Kings Langley.
Davidson, Peter .....London.
Nurse, James Aldis .....London.
Palmer, Frank Thomas .....Cheltenham.
Philp, Wm. John Ignatius .....Gosport.
Richards, Thomas Coombs .....Cheltenham.
Smee, Walter Wallis .....Southampton.
Street, Albert Ernest .....Ampthill.
Watts, Robert .....Sheffield.
Woolley, Samuel Walter.....Stamford.
Wright, William Charles .....London.

Life Member.

Watson, Frederick Percy .....Lincoln.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Baker, William Ritchie .....London.
Bayley, Joseph Benjamin .....Lichfield.
Blankley, Thos. Ernest Bagshaw.Banbury.
Brisley, George..... .....Bexhill.
Buckley, George Philip .....London.
Burden, Chas. Henry Brown ...Nunhead.
Chalmers, John .....Newport (Salop).
Clarke, Charles Henry .....Chepstow.
Cox, Frederick.....London.
Deighton, Frank ....Bradford.
Dunn, George Marchant.....Gravesend.
Flett, Arthur .....Uddingston.
Freke, Cecil Henry.....London.
Gant, Robert Richard.....Bushey.
Godsell, Philip George .....Wolverhampton.
Gould Charles William .....Chiswick.
Haynes, Joseph Alfred .....Boscombe.
Heyes, Thomas Harry.....Bolton.
Hopper, James Henry .....London.
Jones, Maurice Howell .....Towyn.
Jowett, William Hall .....Blackburn.
North, Samuel James .....Grimsby.
Owen, Alfred Ernest .....Newcastle-on-Tyne.
Pearson, William Jackson .....Leicester.
Playford, Frederick William ...Norwich.
Rees, Charles Joseph .....London.
Robinson, Richard Fredk. Wm..Seacombe.
Simpson, Alexander Henderson.Forfar.
Thompson, George .....Knaresborough.
Whyte, Joseph Allan Fowlie...New Deer.
Woodman, George .....Odiham.
Woodruff, Albert Edward .....Eastry.
Young, John.....Douglas (I.M.).

ASSOCIATES.

The following, having passed the Minor examination and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Averill, George.....Stafford.
Bancroft, Charles Frederick ...Great Grimsby.
Baugh, Richard .....Carnarvon.
Beard, Albert Edward .....Haddenham.
Beringer, Heinrich Roland.....Redruth.
Bond, Ernest Greensill .....Liverpool.
Briggs, Thos. Seth Harwood ...Darwen.
Brigham, George .....Hull.
Bunker, Chas. Jas. Garibaldi...London.
Bunn, John Edwin James .....Newent.
Cadge, Chas. Christopher Hume.Alford.
Cairns, Frederic Arthur .....Birkdale.
Coles, Arthur ....Uxbridge.

Cooper, John Henry .....Loughborough.
Cowper, Joseph.....Penrith.
Crane, John Hammond .....London.
Crawford, David .....Rutherglen.
Cutmore, Frank .....Totnes.
Dancy, Ralph .....Turner's Hill.
Davenport, Richd. Cartwright..Talgarth.
Davis, John .....Nottingham.
Dawson, Edwin ....Stamford.
Doe, Walter James .....Rochester.
Dougall, Wm. Robt. Braidwood.Aberdeen.
Edwards, Walter .....London.
Everett, Walter Edes .....Colchester.
Everingham, Fred. Adolphus...Market Weighton.
Fields, Tom William .....Beverley.
Fox, Frederick William .....Lincoln.
Franklin, John William .....Gloucester.
Fryer, Edwin .....Market Deeping.
Goodwill, William Ernest .....Darlington.
Gratton, George Edwin .....Conway.
Green, Herbert .....Hucknall Torkard.
Griffiths, Thomas.....Carmarthen.
Hamlin, Charles Booth ....Crediton.
Hankinson, Alfred William .. Grange-over-Sands.
Hindle, Robert George .....Wirksworth.
Hogg, Vincent Hopkins .....Bideford.
Holyoake, William Wringrose..Leicester.
Hubbard, Henry Joseph.....Norwich.
Hunt, Herbert George.....Newport (I.W.).
Jackson, Thomas.....Altrincham.
Jeffery, Elias .....Falmouth.
Johnstone, James.....London.
Jones, Eustace Harry.....Dartford.
Lynn, John Robert.....Grantham.
McDougall, Allan Murray.....Greenock.
McGillivray, Finlay .....Navin.
Makepeace, Alfred Joseph.....Nuneaton.
Millard, Edgar James.....Derby.
Miner, Major Thomas.....Walsall.
Morris, Edward Stow.....Sleaford.
Morris, Henry Charles .....Tamworth.
Neil, John..... .....Glasgow.
Park, Frederick .....Tynemouth.
Pattinson, Hedley .....Haltwhistle.
Phillips, Benjamin .....St. Clears.
Poole, Weston .....Newcastle (Staffs).
Richmond, Alfred Edward.....Great Yarmouth.
Robson, Robert.....Darlington.
Robertson, George .....Bridge of Allan.
Roe, Edwin John.....Nottingham.
Sharman, Charles Richard.....Towcester.
Smith, Frederick .....London.
Smith, Joseph Henry .....Moreton-in-Marsh.
Spanton, John .....Thornton.
Stanton, Leonard William.....Wolverhampton.
Taylor, Arthur Robert .....Rugby.
Taylor, Wm. Chadwick Coates..Saltburn-by-the-Sea.
Thomson, John.....Edinburgh.
West, David Dudley .....London.
Westover, John Turton .....Bridgnorth.
Whaley, Thomas Cope.....Barnsley.
Williams, John Llewellyn .....Llantrissant.
Williamson, Henry .....South Shields.
Woolley, Edward James..... Manchester.
Wright, John .....Macclesfield.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Amos, Harry Beard.....Canterbury.
Bilby, Frederic Wm. C. .....Kidderminster.
Blamey, John .....Penryn.
Broome, Bertie .....Cromford.
Collier, Henry William .....London.
Davies, Thomas ..... Aberystwith.
Dunning, James .....Manchester.
Dunsford, Thomas William.....Modbury.
Fagan, Albert Edw. Thorsby...Scarborough.
Frith, John Benjamin .....Coggeshall.
Gough, Ernest William .....Clifton.
Hall, Sydney Charles .....Newark.
Hicks, Frederick Robert.....York.
Huckle, Arthur Hy. Headley...London.
Hunter, Robert..... .....Glasgow.
Hyne, Henry .....Landport.
Jackson, George ... .Leeds.
Jones, Arthur Alderson .....Liverpool.
King, Charles James Draper...London.
Lander, Arthur.....St. Keyne.
Longman, Samuel Hurman.....Wincanton.
Martin, George Hymers .....Gateshead-on-Tyne.
Montgomery, Colin Campbell...Rutherglen.
Murdoch, John Thomson .....Edinburgh.
Parish, Alfred James ... .Kidderminster.
Pattison, Thomas Dowson .....West Hartlepool.
Pennington, John Noble.....Ulverston.
Rees, William Edward .....Llanidloes.
Rippon, Richard Waller .....Leamington.
Shera, William Arthur .....Horncastle.
Tapp, Charles .....Sittingbourne.
Taylor, James .....Eccles.
Thorp, Alfred Wild.....Gildersome.
Warhurst, William Herbert ...Liverpool.
Wellburn, Halder.....Pickering.
Young, Archibald John .....South Queensferry.

Several persons were restored to their former status in the Society upon payment respectively of the current year's subscription and a fine.

HONORARY MEMBERS.

The PRESIDENT said in accordance with the Bye-laws this was the day for the election of Honorary Members, and he had much pleasure in proposing the names of twelve distinguished gentlemen. Most of the members were aware that in the draft Bye-laws that had been recently drawn up and submitted to the Privy Council there were certain provisions with regard to Honorary Membership, which would have had the effect of creating two classes, and whilst there was a hope of these Bye-laws being confirmed the election of Honorary Members had been suspended. The matter might probably come up again at some future time, but in the meanwhile it was thought better that the vacancies in the present list, which was limited to fifty, should be filled up. He had much pleasure in bringing forward the names, which were submitted last month. They were the names of men so distinguished that it would be out of place for him to say anything more about them than that, while they hoped that some little compliment would be paid to these gentlemen by being enrolled Honorary Members, the Society itself would be honoured by having their names associated with the other eminent men on that roll.

The VICE-PRESIDENT seconded the motion, and the following gentlemen were unanimously elected Honorary Members:—

Sir Henry Wentworth Acland, K.C.B., M.D., F.R.S., President of the Medical Council, Regius Professor of Medicine in the University of Oxford, Hon. Physician to H.R.H. the Prince of Wales; Hon. LL.D. Camb., Edin., Durh.; Hon. M.D. Trin. Coll., Dubl.; F.R.C.P. Lond.

Joseph Bosisto, C.M.G., M.P. (Victoria), J.P., past President of the Pharmaceutical Society of Victoria.

Christian Brunnengräber, Ph.D., President of the Deutscher Apotheker-Verein. Rostock.

Thomas Lauder Brunton, M.D., D.Sc., F.R.C.P. Lond. F.R.S.

Heinrich Anton De Bary, Professor of Botany, Strass-

burg University, M.D., Ph.D., Foreign Memb. Roy. Soc., etc.

William Turner Thiselton Dyer, C.M.G., F.R.S., M.A. Oxon., B.Sc. Lond., F.L.S., Fell. Univ. Lond.; Hon. Fell. K.C.L.; Director of the Royal Gardens, Kew.

Thomas Richard Fraser, M.D., F.R.S., F.R.C.P.E., Professor of Materia Medica and Clinical Medicine and Dean of the Faculty of Medicine, University of Edinburgh.

Professor Ladenburg, Ph.D., Hon. M.D., Professor of Chemistry and Director of Chemical Laboratories in the University of Kiel.

Professor J. M. Maisch, Professor of Materia Medica and Botany, Philadelphia College of Pharmacy, and Permanent Secretary of the American Pharmaceutical Association. Philadelphia.

C. Méhu, M.D. Paris, Member of the Academy of Medicine, Paris, Pharmacien de l'Hôpital Neckar, past President of the Pharmaceutical Society of Paris.

Professor Pasteur, Member of the Institute of France, F.R.S. Paris.

Anton v. Waldheim, President of the Gremium of Pharmacists of Vienna; Vice-President of the Austrian Pharmaceutical Society; Chairman of the International Pharmacopœia Commission. Vienna

Reports of Committees.

FINANCE.

The report of this Committee included a recommendation of the payment of the ordinary accounts, and also of a sum not exceeding £1500 to the contractors during the current month, on the architect's certificate.

The PRESIDENT moved the adoption of the report, and explained that the £1500 for the contractors was in lieu of the £1000 authorized last month, and would only be paid in the event of the architect certifying that sufficient work had been done to justify the payment.

The motion was agreed to unanimously.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants :—

£10 to the widow (aged 57) of a member from 1853 to 1885 ; in bad health and without means. Applicant has had one previous grant of like amount. (Lincolnshire.)

£5 to the widow (aged 51) of a registered chemist and druggist. Applicant's husband died in March last, leaving her with three children dependent on her, but with no means. (Norfolk.)

£10 to the widow (aged 57) of a member from 1852 to 1871. The husband died in February last, and her children are not in a position to support her. (Middlesex.)

£10 to a registered chemist and druggist (aged 84), female, has some little means, but is nearly blind and requires an attendant. (Monmouthshire.)

£5 to the widow (aged 47) of a member from 1871 to 1883. Applicant has had two previous grants, has nine children, three dependent on her and two partly so ; three others are in orphan asylums. (Suffolk.)

One case had been deferred for further information, and two others the Committee had declined to entertain.

The VICE-PRESIDENT moved the adoption of the report and recommendations, which was carried unanimously.

BENEVOLENT FUND DINNER.

This Committee had held two meetings, and had approved a circular for distribution amongst members and others ; the arrangements for the dinner had also been approved.

The PRESIDENT, in moving the adoption of the report, reminded the Council that this was an official dinner, and was under the control of the Council as custodians and distributors of the Fund. Most of the members probably had received the circular, calling upon all who were connected in any way with the Society or the trade to remember that this was the usual decennial period when a special appeal was made for donations and subscriptions, and inviting them to send in their donations so that they might be announced at the dinner, He would remind them that this Fund was intended for the relief of necessitous persons who were or had been on the Register of Chemists and Druggists, and to the widows and orphans of such persons, whether they were connected with the Society or not. He would repeat once more that the Society simply acted as trustee of the Fund, and all the money contributed to it from the general funds of the Society, and from the members, was now merged in one common fund, and was distributed by the Council in the most catholic spirit.

The motion was carried unanimously.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars :—

	Attendance.	Total.	Highest.	Lowest.	Average.
March	Day . . .	606	32	19	22
	Evening .	223	14	3	9

Circulation of books.	Town.	Country.	Total.	Carriage paid.
March . . .	189	156	345	£2 1 5½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors :—

For the Library in London—

Nova Acta Academiæ Cæsareæ Leopoldino-Carolinæ Germanicæ Naturæ Curiosorum, tom. 48, 1886. From the AKADEMIE.

Tarbouriech (A. P.), Des Euphorbiacées, 1886.

Fabre (L. A.), Étude sur l'aloes, 1881.

From Professor SOUBEIRAN.

Middlesex Hospital, Reports for 1885.

From the HOSPITAL.

College of Preceptors, Calendar, 1887.

From the COLLEGE.

Chemical Society, Journal, 1886.

Deutsche chemische Gesellschaft, Berichte, 1886.

From Mr. WALTER HILLS.

Smithsonian Institution, Annual Report for 1884, part 2. From the INSTITUTION

For the Library in Edinburgh—

Smithsonian Institution, Annual Report for 1884, part 2. From the INSTITUTION.

The Committee recommended the purchase of the undermentioned works :—

For the Library in London—

Botany of the Challenger Expedition, vol. 2.

Bentham, British Flora, 5th ed., 1887.

Brunton, Text-book of Pharmacology, 3rd ed., 1887

Lyons, Pharmaceutical Assaying, 1886.

Richards, Aluminium, 1887.

Vogl, Anatomischer Atlas zur Pharmakognosie.

Godfrin and Noel, Atlas manuel de l'histologie des drogues simples, 1887.

Tomes, Dental Surgery, 3rd ed., 1887.

A request from the Kaiserliche Leopoldinisch Carolinische Deutsche Akademie der Naturforscher for the *Pharmaceutical Journal* from its commencement was laid before the Committee.

The Committee recommended that the request be granted.

Museum.

The Curator's report had been received, and included the following particulars :—

	Attendance.	Total.	Highest.	Lowest.	Average.
March	Morning .	534	33	8	14
	Evening .	102	14	1	3

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Transparent Linimentum Terebinthinæ.
From Mr. J. Bland.

Specimen of Ginseng root.
From Mr. R. M. Houghton, Haslar Hospital.

An original packet of Strophanthus pods.
From Messrs. Burroughs and Wellcome.

Specimens of the Dyak arrow poisons from Borneo.
From Mr. Brooke Low.

Kali seeds. From Mr. H. Helbing.

Specimens of *Huechys sanguinea* and of the kernels of *Prunus Mahaleb*.
From Messrs. Hodgkinson, Tonge and Stead.

Fresh fruits of *Ægle Marmelos*.
From Mr. P. W. Squire.

Eight specimens of the commercial varieties of Turmeric root. From Messrs. Hale and Son.

Specimen of green Olive oil.
From the Chiswick Soap Company.

Specimens of *Elaterium* and of fresh Aconite roots.
From Mr. F. Ransom, Hitchin.

Specimens of fresh Aconite root.
From Mr. J. C. Shenstone.

A series of specimens of unidentified drugs from India and the Corea. From Dr. Dymock, Bombay.

Specimens of the Tangkawang fats from *Shorea aptera*, Burck; *S. stenoptera*, Burck; *S. Gysbersiana*, Burck; and *Isoptera Borneensis*, Scheff; and of the fats of the seeds of *Palaquium oleosum*, Burck; and *P. javense*, Burck; also a series of the Ledger barks cultivated in Java derived from cuttings and from seeds.
From Dr. Burck, Buitenzorg Botanic Gardens, Java.

To the Herbarium—

Specimens of *Isoptera Borneensis*, Scheff; *Shorea stenoptera*, *S. Gysbersiana*, *S. aptera*, *S. Martiniana*, *S. Pinanga*, the plants yielding Tankawang fats in Borneo and Sumatra; also a series of plants yielding gutta percha, including *Palaquium Borneense*, *P. Gutta*, *P. oblongifolium*, *P. oleosum*, *P. Pisang*, *P. Treubii*, *P. Treubii*, var. *parvifolium* and *Ceratophorus Leerii*.

Specimen of pure Lecithin.
From Messrs. H. C. Baildon and Son.

The Assistant Secretary, Mr. J. Rutherford Hill, had reported the following donations to the Museum of the Society in Edinburgh:—

Specimen of Caliche, a native sodium nitrate from Bolivia; specimens of Cinchona barks, including Carthagena, Columbia and New Grenada barks, and mossed Crown bark from Madras; and a specimen of Cryptopia.
From Messrs. T. and H. Smith and Co.

A specimen of pure Lecithin.
From Messrs. H. C. Baildon and Son.

The Professors had attended and reported on their respective classes.

An application from the Chemists' Association of Nottingham for materia medica specimens had been received, which it was recommended should be granted.

Certain painting and cleaning of the premises was recommended.

The draft Annual Report had been considered, and at an adjourned meeting approved.

The President moved the adoption of the report and recommendations.

The Council went into committee to discuss a question raised by one of the members with regard to papers read at the Evening Meetings.

On resuming, the report and recommendations were received and adopted.

The Annual Report.

The Council then went into committee to consider the draft Annual Report.

On resuming, a resolution approving the draft Report, with certain verbal amendments, was unanimously agreed to, and the Report was ordered to be printed and sent out with the voting papers.

The Report will be found on p. 904.

Law and Parliamentary.

This Committee had held two meetings, at which the President had reported the progress and condition of the Pharmacy Acts Amendment Bill, and after discussion it was agreed that he should communicate at such times as he thought fit with the various local associations in order to obtain their active support of the Bill.

This report was considered in committee, and the President explained the position in which the Bill then stood.

On resuming, the report and recommendations were agreed to.

General Purposes.

The report of this Committee included the usual letter from the Solicitor reporting upon cases which have been placed in his hands.

Pidgeon, Grocer, Weymouth,

on proceedings being instituted against him, had paid the penalty and costs into Court, with an undertaking not to offend again.

T. W. Dyball, Ipswich,

had also paid £5 15*s.* into Court, the amount of penalty and costs for which he confessed judgment in March last.

The Committee had considered several cases of alleged infringement of the Act, and recommended proceedings being taken in most of them.

The Council went into committee to consider this report, and one of the cases was discussed at some length.

On resuming, the report and recommendations were unanimously agreed to.

The North British Branch.

The following interim report of the Executive on the progress of this Branch had been received, and was read by the Secretary:—

Interim Report of the Executive of the North British Branch.

"The time that has elapsed since the election of the Executive of the North British Branch being short, and a report for 1886 having been forwarded to the Council at the end of December, it is not necessary to make any lengthy report at the present time.

"The various departments connected with the Branch continue in a satisfactory condition, as will be seen from the following particulars:—

"*The Examinations.*—Though the number of candidates has, of late, been considerably larger than formerly, the examinations are conducted with ease and comfort, and the premises are found to be conveniently arranged and well adapted to the purpose.

"*Evening Meetings.*—The Executive have been able to resuscitate the Evening Scientific Meetings of the Society in Edinburgh, and, so far, they have been attended with marked success. These meetings are found to be a valuable means of promoting the interests of pharmacy, and to have, also, an important influence in maintaining the dignity and position of this Society among members of the medical profession, and in other scientific circles.

"*Library.*—The Library has been considerably enriched, partly by donation, but mainly by the addition of new and standard works by purchase. These additions have been very generally appreciated, and the circulation of books continues steadily increasing, as will be seen from the following statement.

Number of Volumes circulated in three months.

	1886.	1887.	Increase.
January.....	28	46	18
February	31	69	38
March	34	82	48
Totals.....	93	197	104

"The circulation of books among provincial chemists shows a slight increase, but there is still room for development in this direction. The facilities for having books on loan do not appear to be so well known among country members as they might be.

"*The Museum.*—The Museum continues to be added to from time to time by various firms and private individuals, who take this means of showing their interest in the Society's welfare. It is also enriched by the addition of duplicate specimens sent down from Bloomsbury Square. The Executive observe that the Council have sanctioned the completion of the chemical collection, and they believe this will make a very valuable improvement and supply a want which has been long felt.

"The advantages offered by the Society's Library and Museum in Edinburgh are increasingly appreciated, as is evident from the considerable increase of visitors as shown in the following table.

Attendance of Visitors during first Quarter of 1887.

	Day.	Evening.	Total.
January.....	196	141	337
February	146	118	264
March	209	184	393
Totals	551	443	994
Corresponding period of 1886.	391	214	605
Increase	160	229	389

"In addition to those who take advantage of the Library and Museum by visiting it, a considerable number of provincial chemists derive benefit and receive useful information by correspondence. In this way the local representation of the Society in Edinburgh is calculated to do much good, and cannot fail to strengthen the position of the Society in Scotland.

"*House.*—It has been found necessary to have the stair laid with new india-rubber mats, with cocoa fibre mats on the landings. This has been done at a cost of £7 13*s.*, and has effected a much needed improvement which is expected to be both durable and economical.

"The caretakers having failed to discharge their duties to the satisfaction of the Assistant Secretary, it was found necessary to dispense with their services. After investigation new caretakers have been engaged on the same terms as formerly, and the change has proved very beneficial. It was also found that the caretakers' apartments required painting and papering, and this has been done at a cost of £2 11*s.*

"H. Bellyse Baildon, *Chairman.*

"36, York Place, Edinburgh,
"*April* 30, 1887."

It was resolved, on the motion of the President, that the report be received and entered on the minutes.

The President said it was very pleasing to find that so good a report could be furnished of the first three month's work of the new Executive. From observations made by himself last week, when he was present at the examinations in Edinburgh, he was extremely gratified to find not only what a number of candidates came in to consult specimens in the museum, and refer to the library, but that there were a number of earnest students of all ages in Edinburgh who used the library both in the day and the evening. The Council, therefore, had no reason to be otherwise than satisfied with the liberality it showed some years ago in purchasing a house for the use of its alumni in Scotland. Naturally the Executive had not so much to report as it would under ordinary circumstances, but probably it was thought desirable to send a report now, acting on the assumption that the election of a new Executive would take place soon after the election of the new Council. The Executive and its Chairman and Vice-Chairman might be congratulated on the progress which pharmacy was making in the north.

The Redwood Trust.

A resolution was passed for affixing the seal of the Society to the transfer of the Great Indian Peninsula Stock into its name as trustees of the Redwood Scholarship fund.

A Memorial from Brighton.

Mr. Savage said he had been waited upon on Monday last by two gentlemen with a memorial signed by fifty chemists and by twelve medical gentlemen of Brighton, the list of the latter being headed by the name of Dr. Withers Moore, President of the British Medical Association, and it was very gratifying, he thought, to find such evidence that chemists and druggists had the sympathy of medical men. The memorial, which he read, was on the subject of dealing in poisons and medicines by co-operative stores and companies; it drew attention to the anomaly of allowing two or more unqualified men to do that which one was not allowed to do, and suggested that an amendment in the law should be obtained, to make it answer the purpose for which it was intended. Mr. Savage said he had explained to the gentlemen who waited upon him the difficulties which the Council had had to contend with. They seemed to think that the Bill now passing through the House of Commons had been so favourably received, that it was possible, after that had passed, that the present Government might treat chemists more liberally than former ones had done Two important points were made, one was in connection with small companies, and another was that of unqualified assistants being employed in branch establishments. He told them with reference to the first matter, the sale of poisons by companies, that every effort had been made by the Council, but that in the present state of the law it was powerless. Another point mentioned was that some wholesale chemists made up small quantities of medicines, including poisons, which were sold in country places by grocers, stationers, and others. He told them that if evidence of such practice was furnished to the Council, proceedings would be taken, but there was always a difficulty in getting people to take the initiative. The Local Secretary often refused to act because he was so well known, and if a stranger went to make a purchase, he was recognized as a stranger and was refused.

The President said that, in order to prevent any possible misunderstanding, he might say that no one was more conscious than every member of the Council of the unsatisfactory state of the law, or the interpretation of the law by the judges with regard to the Pharmacy Act of 1868. The only answer was that they could not alter the law without satisfying the House of Commons that it was desirable so to do. There was a great deal of difficulty in getting what was considered an unopposed Bill through Parliament in the present state of public business. More power and greater influence in legislation were required before anything could be done, and above all there was needed some certainty that the legislators thought it necessary that this kind of trading should be stopped, and as to that there was some doubt. Some very thoughtful persons were of opinion that the public were sufficiently protected if the sale was effected by a qualified assistant; and though he had no doubt that in many cases even the letter of the law was broken now, no qualified assistant being employed, there was often a difficulty in dealing with the offenders. If evidence were forthcoming the Council would be very glad to deal with such cases, but at present, there was no evidence that the Legislature would be willing to amend the law in the direction desired by the memorialists. When the Government itself proposed an amendment of the Act of 1868 with regard to the sale of poisons, the proposal was that in the case of a corporation the name of the manager should appear on the label, and that he should be responsible, and that seemed to be as far as the Government was prepared to

STATEMENT OF ATTENDANCE OF MEMBERS OF COUNCIL ON COMMITTEES FOR THE YEAR 1886-87.

	Committees held Once a Month or Oftener.		Committees held Occasionally.		Special Committees.	Total Number of Attendances.*
	Finance.	Library, Museum, Laboratory, and House.	Benevolent Fund.	General Purposes.		
Number of Committee Meetings held.	11	13	10	10		
Allen (*London*)	11	11	*	10	16	48
Atkins (*Salisbury*)	*	11	9	9	7	36
Baildon (*Edinburgh*)	8	*	*	8	4	20
Borland (*Kilmarnock*)	*	*	6	6	7	19
Bottle (*Dover*)	*	10	8	7	7	32
Butt (*London*)	*	13	8	10	17	48
Carteighe (*London*)	11	13	0	10	30	64
Cross (*Shrewsbury*)	*	*	10	10	8	28
Gostling (*Diss*)	0	7	9	8	14	38
Greenish (*London*)	*	5	5	8	*	18
Hampson (*London*)	*	7	*	3	0	10
Hills (*London*)	8	13	*	9	15	45
Radley (*Southport*)	*	*	10	10	*	20
Richardson (*Leicester*)	*	*	5	5	5	15
Robbins (*London*)	*	13	10	8	15	46
Savage (*Brighton*)	9	12	*	8	*	29
Schacht (*Clifton*)	9	2	*	8	7	26
Southall (*Birmingham*)	*	*	9	9	*	18
Symes (*Liverpool*)	*	3	5	5	3	16
Williams (*London*)	*	7	8	9	6	30
Woolley (*Manchester*)	5	*	*	6	2	13

* Not appointed on this Committee.

NUMBER OF ATTENDANCES OF MEMBERS OF COUNCIL AT COUNCIL MEETINGS FOR THE YEAR 1886-87.

Allen, Charles Bowen	11	Cross, William Gowen	11	Robbins, John	10
Atkins, Samuel Ralph	10	Gostling, Thomas Preston	10	Savage, William Dawson	11
Baildon, Henry Bellyse	9	Greenish, Thomas	11	Schacht, George Frederick	10
Borland, John	7	Hampson, Robert	9	Southall, Alfred	10
Bottle, Alexander	11	Hills, Walter	11	Symes, Charles	11
Butt, Edward Northway	11	Radley, William Valentine	11	Williams, John	10
Carteighe, Michael	11	Richardson, John George Fredk.	10	Woolley, George Stephen	9

Number of Meetings during the year, 11.

go. He could only say that, while conscious of all these difficulties, the Council deeply sympathized with the memorialists.

Mr. WILLIAMS remarked that Brighton was not the only place which suffered from this kind of thing.

PHARMACEUTICAL SOCIETY OF SOUTH AUSTRALIA.

An application from Mr. Harrison, President of the Pharmaceutical Society of South Australia, for certain specimens, was referred to the Library and Museum Committee.

LEICESTER CHEMISTS' ASSOCIATION.

An application from the Leicester Chemists' Association for a copy of the Register, as published, was agreed to.

APPROACHING RETIREMENT OF PROFESSOR BENTLEY.

The PRESIDENT read a letter from Professor Bentley, intimating his intention to resign his professorship at the termination of the present session. He said he deeply regretted that the Professor had felt called upon to adopt this course, but at the present moment, especially as several of the members of the Council had left, he thought it better not to make any comments on the letter, but to refer it to the Library and Museum Committee to be considered and reported on at a future meeting, when there would be a better opportunity for him and others to express what they felt with regard to the long services which Professor Bentley had rendered to the Society and to pharmacy. The Committee should also be instructed to report what steps, if any, should be taken with regard to the teaching of botany and materia medica in the future.

A resolution to the above effect was carried unanimously.

REPORT OF EXAMINATIONS.

April, 1887.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (20th)	6	3	3
„ (21st)	6	4	2
„ (26th)	6	6	0
„ (27th)	5	5	0
	—23	—18	—5
Minor (20th)	28	10	18
„ (21st)	25	12	13
„ (22nd)	30	14	16
„ (26th)	28	13	15
„ (27th)	28	9	19
„ (28th)	28	13	15
„ (29th)	29	14	15
	—196	—85	—111
	219	103	116

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Major (27th)	2	1	1
Minor (18th)	11	6	5
„ (19th)	13	4	9
„ (27th)	12	3	9
„ (28th)	13	7	6
„ (29th)	13	9	4
	—62	—29	—33
	64	30	34

Preliminary Examination.

	Candidates.		
	Examined.	Passed.	Failed.
12th	420	222	198

29th. 22 certificates by approved examining bodies were recieved in lieu of the Society's examination.

Proceedings of Societies in London.

ROYAL INSTITUTION.

THE ROLLING CONTACT OF BODIES.

On Friday, the 29th ult., Professor Hele Shaw delivered a lecture at the Royal Institution upon "The Rolling Contact of Bodies." He commenced by putting forward the proposition that when a carriage wheel is rolled along, any particular point upon the tyre of the wheel always reaches and leaves the ground in a perpendicular direction. In order to demonstrate this, attention was drawn to the fact that on revolving a wheel from which the tyre had been removed, the central point at the extreme end of a spoke always reached the ground, and remained there only whilst the spoke itself was in a perpendicular position. Further, in order to make the truth of his statement more apparent to his audience, the lecturer had recourse to a small solid wheel, to one side of which near the edge was attached a small brush, so that as the wheel rolled along a level surface, the brush accurately marked upon a suitably adjusted screen the direction of the course taken by that portion of the wheel upon which it was fixed. The diagram so obtained proved to be a representation of a series of cycloidal curves, the lowest points of which were reached in a perpendicular direction. Similarly, by causing the solid wheel to travel in a curved path, any point upon it reached its lowest point in a direction perpendicular to a tangent drawn to the curve at that point. From these results it was therefore deduced that in the rolling contact of bodies, points always approach each other in a perpendicular direction. But, beyond the mere rolling contact, there is also a sliding motion, which may be brought about from various causes and is regarded as the effect of tangential force. Thus in a railway train the wheels of the carriages have merely a rolling motion, but the wheels of the locomotive, besides the rolling motion, exert a considerable amount of tangential force, due to the function of the locomotive in drawing the train. In the case of the wheels of the railway carriages, where there is a mere rolling contact, there should therefore be no expenditure of energy; but, as a matter of fact, even with the most highly polished surfaces there is always a certain amount of energy lost, due to a sliding of the surfaces to a greater or less extent. But in such a great measure is this loss of energy overcome that Professor Shaw quoted a case in which, by means of a system of wheels rolling upon each other, a turn-table weighing fourteen tons, when once set in motion, only requires a force of three and a half pounds to keep up its revolutions. The same principle is applied in a number of swing bridges, and in other cases where heavy weights are required to be moved with little power. The lecturer then went on to explain the application of rolling contact in the employment of machines for measuring distances, and in other instruments, such as Sir W. Thompson's harmonic analyser for computing the state of the tide at any place for any time. But in all these instruments Professor Shaw pointed out certain corrections had to be made to allow for the tendency of the wheels to slip over each other. In order to illustrate this tendency the lecturer referred to an experiment in which he had made two wheels revolve round each other ten thousand times, and found then that they had slipped one thirty-second of an inch from their original position, or about one inch in three hundred thousand revolutions. Though this tendency may no doubt be reduced with more perfect instruments, yet to a slight degree it always remains. At the same time Professor Shaw remarked that a minute force exerting itself in a lateral direction would soon have an appreciable effect upon a revolving wheel, although it might be quite imperceptible in its action when the wheel was stationary. This point the lecturer also well illustrated by means of experiment. He then drew attention to a phenomenon which is observed

during the rotation of a ball by means of a revolving cylinder. If a polished wooden ball be placed upon two polished wooden rollers, one of which is kept stationary while the other is made to revolve, a rolling motion is communicated by contact to the ball; but besides the mere rolling motion a lateral movement of the ball along the roller is also observed, and the curious part of the phenomenon is, that although the roller may be turned in either direction, the lateral movement of the ball is always in the same direction. This lateral movement appears very remarkable and difficult to explain, if it be accepted that the ball is a perfect sphere and that the wooden cylinders are mathematically correct and placed in a perfectly horizontal position. If the wooden ball be replaced by one of harder material, or a ball of iron, the lateral motion is perceptibly increased; but the greatest effect is obtained when the wooden rollers are either substituted by rollers of india-rubber, or else covered with a sheet of that material. This phenomenon has never been satisfactorily explained, but Professor Shaw now thinks that he has been able to do so, although he only arrived at the solution of the problem which he put forward as recently as the previous afternoon. Of course when a ball is placed upon a body its weight causes a certain amount of distortion in the surface of that body, and causes forces to be exerted, acting on the ball from all sides. But when a ball is in motion the direction of these forces is considerably altered. The direction of the force in the surface of the body in front of the ball during its passage is maintained, and its power is intensified; but the direction of the force in the surface behind the ball is reversed, owing to the release of pressure from the weight of the ball in that spot. To these changes in the direction of the forces Professor Shaw ascribes the cause of the phenomenon.

Provincial Transactions.

TORQUAY CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting was held on April 20, at which there was a small attendance. Mr. Drayton in the chair. It was announced that Mr. F. March had been awarded the prize for the best essay on pill making and pill coating. Mr. E. H. Farr delivered a lecture treating of the different ways of taking melting points and specific gravities of substances, and of the introduction to organic chemistry. The usual votes of thanks concluded the proceedings.

Obituary.

Notice has been received of the death of the following:—

On the 11th of April, Mr. Henry William Hills, Chemist and Druggist, Leyton. Aged 54 years.

On the 19th of April, Mr. Henry William Hern, Pharmaceutical Chemist, St. Austell, Cornwall. Aged 67 years. Mr. Hern became a Member of the Pharmaceutical Society in 1845, and for several years filled the office of Local Secretary.

On the 22nd of April, Mr. Felix Robert Clarance, Chemist and Druggist, Clarendon Road, Notting Hill, W. Aged 50 years.

On the 22nd of April, Mr. William Ekins, Pharmaceutical Chemist, Huntingdon. Aged 62 years. Mr. Ekins became a Member of the Pharmaceutical Society in 1853.

On the 23rd of April, Mr. John William Best, Pharmaceutical Chemist, Darlington. Aged 32 years. Mr. Best became a Member of the Pharmaceutical Society in 1876.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

A Memorial from Brighton.

Sir,—By the report of this week's Council meeting your readers will see that the chemists of Brighton and Hove have addressed a petition to the Council of the Society urging it to take such steps as it may deem necessary to prevent unqualified persons conducting the business of a pharmacist (whether employing qualified assistants or not) to the detriment of the public, the medical profession and the body pharmaceutic.

Now as this petition is supported by the signature of the President of the British Medical Association, and many other leading medical practitioners of the borough (time did not permit of ascertaining the views of all), each one of whom expressed his entire sympathy with the chemists, it may not unreasonably be argued that it has a claim to the consideration of the Council; and we think that if the chemists of other towns would follow the initiative of Brighton in petitioning the Council and obtaining the support of their local medical men in so doing, that doubtless the eminently worthy directorate of our Society would ultimately endeavour to accomplish the object of the petitioners, and perhaps even to once more proceed with the very excellent Pharmacy Bill of two or three years ago, which after all the trouble bestowed upon it came to such an untimely end. We are emboldened to think thus by the very marked degree of success which up to the present has attended the "Curriculum" Bill.

Brighton. "The Originators of the Petition."

Concentrated Medicines.

Sir,—I hope the letter of C. A. J. will be copied into the medical journals, such as the *Lancet*, etc., where the faculty would be likely to see it. We are suffering from a similar grievance in our town, where a physician, who has an extensive practice, very rarely prescribes any other but very concentrated medicines, *i.e.*, 6 ounce and 8 ounce into tablespoonfuls, and sometimes into one or two teaspoonfuls, with often 4 or 5 ounces of tincture in each; and this is not our only misfortune, for he occasionally varies his prescriptions with Fellows' Syrup ℥iv., Davis's Cascara Sagrada, and other American remedies, and liq. arsenic., syr. ferri phosph., Squire, and he will even go so far as to inform his patient that he ought not to pay more than so and so for it, naming, of course, a minimum price. It really seems, nowadays, that even our friends the physicians are combining to prevent the poor chemist from getting a reasonable profit. Pharmacist.

A Caution.—Mr. Griffin, of Birmingham, wishes to publish a caution in respect to a man who is endeavouring to obtain a situation by means of a forged testimonial, which shows the desirability of making inquiries as a rule before accepting documentary evidence as to character.

Erratum.—Dose of Ammonium Picrate.—In reporting the discussion following the reading of Mr. Dymond's paper on "The New Antipyretics," Mr. W. G. Blackham was, on p. 897, erroneously represented as giving the dose of ammonium picrate as "less than one gram," instead of "less than one grain."

A. E. Lomax.—Cryptandra, 27; Stenandrium (Acanthaceæ), 58; Isanthus, 130; Heliocharis, 6; Breweria, 19; Dichromena, 7; Elsholtzia, 27; Ampelodesma, 210; ? Lophosciadum, DC., 91; Stylidium, Lour. (Cornaceæ) = Marlea, Roxb., 2.

Fairplay.—We think the view you have taken of the matter referred to is entirely a mistaken one.

W. Moore.—Considering the long hours during which you are engaged you might reasonably urge the allowance of some time for study.

W. J. Thomas.—The Bill will be found in the Journal for February 5 last, p. 631, and copies may be obtained from Messrs. Spottiswoode.

Communications, Letters, etc., have been received from Dr. Trimen, Messrs. Shillinglaw, Macaulay, Thompson, Segg and Co.

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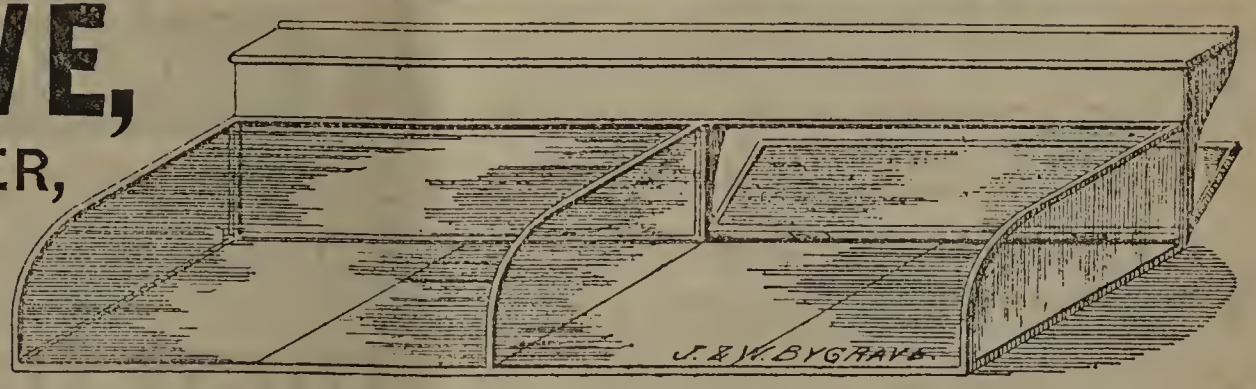

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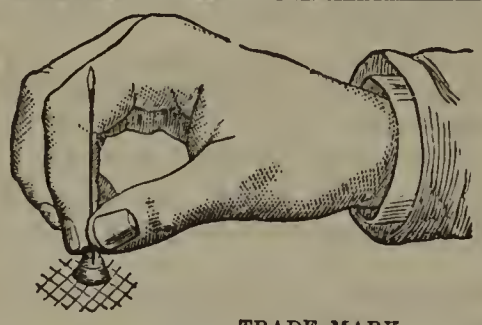

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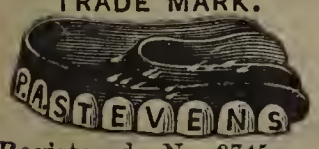

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„ T. S. H. BRIGGS, Darwen.
„ F. W. FOX, Brighton.
„ W. NEILSON, Blackburn.
„ A. BEGG, Bolton.
„ T. JACKSON, Altrincham.
„ H. WILLIAMSON, Bedale.
„ — GOURLAY, Manchester (Feb. 7.)

APOTHECARIES' HALL.

Mr. F. W. FOX. | Mr. F. HART.
Mr. W. S. ALVEY.

PRELIMINARY.

Mr. J. DUNNING, 131, Embden Street.
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„ J. H. CRANE.
„ E. FRYER.
„ J. HOOPER.
„ A. E. RICHMOND.

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MAJOR.

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MINOR.

Mr. A. E. BEARD.
„ H. R. BROAD.
„ J. E. J. BUNN.
„ F. L. CARTER.
„ R. C. DAVENPORT.
„ E. EDWARDS.
„ F. EVERINGHAM.
„ J. H. FILMER.
„ J. W. FRANKLIN.
„ W. E. GOODWILL.
„ A. S. GLOVER.
„ A. W. HANKINSON.
„ J. B. HARRIS.
Mr. R. G. HINDLE.
„ E. JEFFERY.
„ T. KITTOW.
„ J. E. MALLINSON.
„ W. PESCOD.
„ G. E. ROSE.
„ R. F. SCOTT.
„ C. R. SHARMAN.
„ J. H. SMITH.
„ A. R. TAYLOR.
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„ G. H. WILKINSON.
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PRELIMINARY.

Mr. W. H. BELTON.
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AS JUNIOR. Height 5ft. 9in. 6 years' Continental and West-end experience. Fluent French. Disengaged May 27th. VINCENT, 16, Tichborne St., Piccadilly Circus, W.

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JUNIOR. Age 20. Moderate salary. T. ELLIOTT, 76, Lozells Rd., Birmingham.

AS ASSISTANT. Age 23. Good West-end experience. Fluent French. London preferred. CHEMIST, 16, Alfred St., Plymouth.

AS ASSISTANT. Age 23. 6½ years' experience. Height 5ft. 8½in. Can Prescribe and Extract Teeth, also work at Mechanical Dentistry. Abstainer. State salary, &c., to GRANT, St. Ives, Cornwall.

JUNIOR, in London, with time to attend evening classes. Aged 21. J. LENTON, 67, Eversfield Pl., St. Leonards-on-Sea.

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LOCUM TENENS. Long experience. Ph. Chemist. Disengaged. X., 121, Cornwall Rd., Bayswater, W.

OUT-DOOR ASSISTANT. Age 23. 9 years' experience. Permanency. TINCTURA, Albion Villa, Rye.

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ASSISTANT. In or out-door. Temporary or otherwise. Age 28. Height 5ft. 10in. R. M., 342, King's Rd., S.W.

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 881.] SATURDAY, MAY 14, 1887. [PRICE FOURPENCE.

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Notice is hereby given that the forty-sixth Annual General Meeting of the Members and Associates in Business of the Society will be held at 17, Bloomsbury Square, Middlesex, on Wednesday, the 18th day of May, 1887, at eleven o'clock in the forenoon, for twelve *precisely*, to receive the report of the Council, and to elect the Council and Auditors for the ensuing year.

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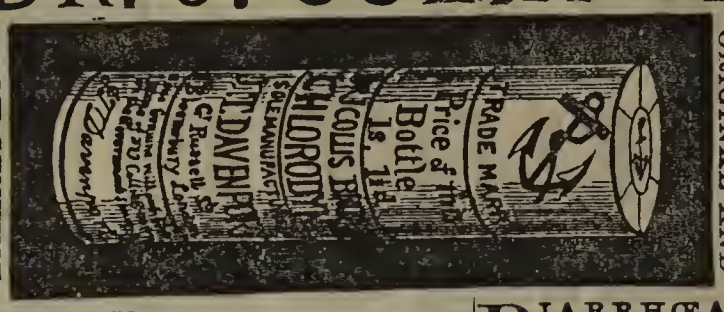
ONLY GENUINE.  ORIGINAL AND

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This Caution is necessary, as many persons deceive purchasers by false representations.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

IS THE GREAT SPECIFIC FOR CHOLERA, DYSENTERY.

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From SYMES & Co., Pharmaceutical Chemists, Simla. *Jan.* 5, 1880.

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DEAR SIR,—We congratulate you upon the widespread reputation this justly-esteemed medicine has earned for itself all over the East. As a remedy of general utility, we much question whether a better is imported, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances *ad infinitum* of the extraordinary efficacy of DR. COLLIS BROWNE'S CHLORODYNE in Diarrhœa and Dysentery, Spasms, Cramps, Neuralgia the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than Collis Browne's, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than Collis Browne's is a deliberate breach of faith on the part of the chemist to prescriber and patient alike.—We are, Sir, faithfully yours, SYMES & CO., *Members of the Pharm. Society of Great Britain, His Excellency the Viceroy's Chemists.*

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IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

FURTHER IMPORTANT NOTICE.

The subjoined list of eminent Firms concur with Vice-Chancellor Sir W. Page Wood's statement in Court that Dr. Collis Browne was undoubtedly the Inventor of Chlorodyne; and that when Chlorodyne, or the Original Chlorodyne, is ordered, they invariably supply Dr. J. Collis Browne's:—

Apothecaries' Hall	London.	Frazer & Green	Glasgow.	Morson, T., & Son	London.
Allen, Hanbury & Co.	,,	Gale & Co.	London.	Newbery & Sons	,,
Baiss Brothers	,,	Giles & Son	Clifton.	Oldham, G., & Co.	Dublin.
Banks & Richards	Birmingham.	Goulding, Messrs.	Cork.	Parsons & Richardson	Leicester.
Barron, Harveys & Co.	London.	Grattan & Co.	Belfast.	Peake, Allen & Co.	Dublin.
Bell, John & Co.	,,	Grimwade, Ridley	London.	Raimes & Co.	Edinburgh.
Corbyn & Co.	,,	Grindley & Son	Chester.	Sang & Barker	,,
Cox & Gould	,,	Hearon, M'Culloch & Co.	London.	Sanger, J., & Sons	London.
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After these public statements in a Court of Equity, and subsequent confirmation by the trade at large, no Chemist can conscientiously use or sell any other compound for Chlorodyne, without committing a breach of faith, unjust to patient and physician. The *value* of the remedy *alone* creates the great demand.

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RANDOM POINTS ON
ALIMENTARY TROUBLES.

THE IMPORTANCE OF
Hydrochloric Acid, Milk, and Peptonised Foods.

Before Leube, the course of inquiry into diseases of the stomach was restricted to percussion, palpation, interrogations, and examining the vomit and ejecta. Some few years ago the plan of washing out the stomach was advocated strongly by many, and the results recorded were very good in some instances, especially gastric dilatation. This led to another step, which is the examination of the gastric juice to ascertain its acidity and activity, and the duration of digestion. It is claimed that in about seven hours a substantial meal should be entirely digested, though during menstruation the process may be prolonged. Several methods are in vogue for obtaining the gastric juice during digestion.

According to Ewald, the nature of the stomach acids varies somewhat at different periods. Within the first half hour lactic acid will be formed; soon hydrochloric acid also appears, and in an hour's time the latter alone is present. Rutherford in his table shows how futile is pepsin without an acid. Many observations have led to the belief that acid is absent in fevers and gastric dilatation; but the most important hypothesis is that of Von den Velden, who insists that an absence of hydrochloric acid in the gastric juice is evidence of a cancerous neoplasm; while this would not seem to always be the case, yet the presence of this acid in the gastric secretion would be strong presumptive testimony that no cancer was present.

The best agent to detect hydrochloric acid is oo tropæoline, which gives a beautiful pink colour with hydrochloric, but not with lactic acid. The normal acidity of the gastric juice is less than 2 in 1000, so that comparative tests are easily made.

In a case of cancer of the stomach, it would seem, then, that the patient's food should be fully predigested, or else a little food given with, say, two or three Fairchild's Pepsin Tabloids; this in conjunction with Zyminised Suppositories.

It seems a fortunate provision, this, whereby acid is no longer abundantly secreted in gastric disease; and the importance of keeping the stomach absolutely quiescent in certain cases where the gastric juice is active appears obvious. When a portion of the stomach-wall loses its vitality, as where the vessel of a part becomes plugged with an embolus and the circulation stopped, the gastric juice can dissolve away the impaired tissues. May not a similar process ensue after the ingestion of corrosives? As the stomach tissues, which form the floor of an ulcer after a dose of corrosive poison, etc., may be somewhat liable to be affected by the gastric juice when secreted, does it not seem as if all food should be withheld from the stomach, and the system sustained by enemata, after the immediate treatment is over. It is claimed that the pain of many dyspeptics is due to the inability of the stomach mucosa to resist the activity of the gastric juice, and thus irritation results. Sir William Roberts holds, we believe, that in dyspepsia *digestion often seems too rapid.* The overcoming of the acidity with soda tablets is of course not always to be desired on account of the subsequent tendency to increased acidity, so that the potass. bicarb. tablets are often to be preferred.

"In the treatment of ulcer of the stomach," says Dujardin-Beaumetz, "Cruveilhier has won for himself lasting renown by having been the first to describe the malady and to find the remedy. This remedy, as you know, is milk diet, carried out in all its rigorousness; on this the life of the patient depends, for if he deviates from this regimen, mortal hœmorrhages may ensue. . . . . Milk, and an exclusive milk diet, are also the most active curative means in chronic catarrh of the stomach" (*Therapeutic Gazette*).

"Milk occupies the first place in the dietetics of abdominal fluxes, and it is by the milk diet rigorously carried out that you will obtain the mastery of these affections. I know, in fact, of but one form of chronic diarrhœa that is rebellious to this treatment, as it is in fact to all other treatment. I refer to tuberculous diarrhœa. . . . In the diarrhœa of infancy, milk is still the remedial agent *par excellence* (the milk being suited to the age of the infant), and whenever you see in your little patients frequent greenish discharges, be persuaded that this diarrhœa results either from cold or the use of improper food" (Ibid).

A little acid added to cows' milk suggests what harm the tough, hard curd may do. Probably nothing in medicine has ever afforded more brilliant results than milk which will not curdle, such as that pre-digested with Fairchild's Peptonising Powders. In the alimentary catarrh of infants, in typhoid fever and old age, peptonised foods are a boon. "The greater variety which can now be given to this form of food by the preparation of peptonised soups, jellies, and blanc-manges will obviate the monotony complained of under the continuous use of peptonised milk gruel."

BURROUGHS, WELLCOME & CO., Manufacturing Chemists, Snow Hill Buildings, E.C.

CHEMICAL NOTES ON COFFEE.

BY DR. B. H. PAUL AND A. J. COWNLEY.

(*Continued from page* 821.)

3. COFFEE TESTING.—Though many persons are of opinion that for ordinary domestic use coffee is improved by the admixture of a certain proportion of roasted chicory, it is evident from the essential differences in the components of these materials that chicory cannot be in any way a substitute for coffee. Chicory yields to boiling water a larger amount of soluble extract than coffee does, and the infusion has a darker colour than that of pure roasted coffee; but it is quite destitute of the essential characteristics of coffee. The practice of mixing chicory with coffee has also been advocated on the ground of economy, for as coffee in the roasted and ground state cannot be sold for less than about 1*s.* or 10*d.* per pound, while chicory costs only 4*d.* a pound, a mixture furnishes a cheaper article of consumption. For both these reasons the sale of such a mixture cannot be regarded as a case of adulteration, when the nature of the article is plainly declared, and the proportion of chicory in it does not exceed a due relation to the price at which it is sold. But neither of these conditions is strictly observed in practice. Mixtures of chicory and coffee are frequently sold under the name of coffee in direct violation of the provisions of the Food and Drugs Act, and what is probably still worse, as a matter prejudicial to the purchaser, the article sold as a mixture varies so considerably in the amount of chicory it contains, that taking into account the difference in the price of chicory and coffee, its real value is often not more than one-half of the price at which it is sold. The results of a very extended examination we have lately made of samples purchased in the ordinary way showed that the admixture of chicory varied from 25 per cent. to as much as 93 per cent., though the prices paid were not less than pure coffee could be sold for, and ranged from 10*d.* to 1*s.* 4*d.* per pound. Some of the mixtures sold at 10*d.* a pound really contained less than three-pennyworth of coffee, with at the most three-pennyworth of chicory, and the profit thus obtained upon them must have been very much —to the prejudice of the purchasers—in excess of that realizable by the sale of pure coffee. These facts clearly prove the necessity of requiring a declaration of the extent of admixture, or even a limitation of what is to be admissible without making the vendor liable under the Food and Drugs Act, for at the present time the objects of that Act are in many cases virtually defeated, so far as regards the supply of coffee to the public. In the report made on this subject by Drs. Carpenter and Swaine Taylor to the Board of Inland Revenue in 1853 the admixture of chicory with coffee was held to be admissible both on the ground of economy, and also for the purpose of satisfying the demand of a class of consumers by whom a mixture was preferred. For these reasons it was recommended that the sale of a mixture should be permitted, but at the same time it was pointed out that the proportion of chicory in it ought never to exceed one-third at the utmost, and that it would be better confined to one-fifth. The reporters considered that the deterioration of coffee by any larger admixture of chicory would be sufficient to prevent dealers from exceeding these limits, and therefore anticipated that it would not be desirable to exercise any supervision or control over the proportions of the mixture. Subsequent experience has proved that these anticipations have not been realized, and that, in the absence of restrictions, the admixture of chicory with coffee is practised in many cases to an unjustifiable extent. Another reason given by the reporters for thinking restrictions undesirable was that they could not satisfy themselves that the proportions of coffee and chicory in a mixture could be ascertained by any method then known, so as to admit of the Government laying down restrictions the enforcement of which could only be effected under the guidance of precise determinations.

In the report by Graham, Stenhouse and Campbell the same difficulty was referred to, and it was considered that for the purpose of ascertaining whether roasted and ground coffee contained admixtures, the characteristic constituents of coffee were less immediately available than certain properties of the infusion of a physical character. For this reason they recommended the method of testing coffee which has hitherto been in use for the purpose of ascertaining its purity and detecting admixtures. It is based upon the fact that, as compared with coffee, chicory and other materials likely to be used as admixtures yield to boiling water a much larger amount of soluble extractive, and consequently give infusions having a greater specific gravity than that of pure coffee. In Dr. Bell's work on 'The Analysis and Adulteration of Food' the application of this method is described, as well as the supplementary tests based on the determination of the amounts of sugar and of fat. With the aid of the microscopical examination of the samples these have been the only means of testing available. The results thus obtained are open to objection on the ground that the substances determined and taken as the standard of purity and the measure of adulteration are not specific constituents of coffee. The test based on the specific gravity of the infusion is also open to objection, because in the case of coffee adulterated with chicory the results thus obtained would be influenced by the kind of chicory that had been used for the purpose, as will be seen from the following statement of the amounts of soluble extract yielded by different kinds, and as it would not be possible to ascertain this point there would be a corresponding degree of uncertainty as to the actual proportions of coffee and chicory in any sample under examination.

Belgian chicory	60 per cent.
German „	59 „
English „	49 „
French „	47 „

By making a 10 per cent. decoction with pure coffee 20·5 per cent. of solid material is extracted, but with Belgian chicory the quantity extracted will be 60 per cent. of solid material. A mixture yielding a decoction that contains 32·98 per cent. of solid material will therefore consist of—

Coffee	63·4	yielding	14·02	extract.
Chicory	31·6	„	18·96	„
	100	„	32·98	„

French chicory yields less soluble extract, according to our observation only 47 per cent., and therefore the proportions will be different in a mixture of it with coffee which yields the same amount of extract, as shown below.

Coffee	52·9	yielding	10·84	extract.
Chicory	47·1	„	22·14	„
	100	„	32·98	„

Consequently when the amount of extract obtained from a mixture of chicory and coffee amounts to 32·98 per cent., or when the liquor has a proportionate specific gravity, there will be that degree of uncertainty as to the amount of chicory present which is indicated above; it may be either 31·4 per cent., if Belgian chicory, giving 60 per cent. extract, has been used, or 47·1 per cent., if French chicory, giving 47 per cent. of extract, has been used. This uncertainty as to the proper interpretation of the results obtained from observation of the specific gravity of decoctions or from the amount of extract yielded to boiling water renders these methods very unsatisfactory for detecting adulteration or the admixture of chicory in undue proportions.

In the report by Graham, Stenhouse and Campbell the determination of caffeine, as the specially characteristic constituent of coffee, was mentioned as a possible means of ascertaining the purity of a sample and detecting adulteration, but the experiments they made with that object led to the conclusion that such a method would be both difficult and tedious. It was also considered that as there was then reason to believe the proportion of caffeine varied considerably in different kinds of coffee, the determination of caffeine in a sample would not show exactly the proportion of pure coffee present in it. Our recent experiments have shown that neither of these objections is well founded, but that on the contrary the amount of caffeine in coffee may be taken as a sufficiently constant quantity to admit of its being made a criterion of purity, and a means of ascertaining the proportion of admixtures, while at the same time the determination of caffeine can be easily and accurately performed both in pure roasted coffee and in mixtures. The method of carrying out this determination has already been described,* and in order to satisfy ourselves that the result obtained in operating upon mixtures of coffee and chicory may be relied upon we have since experimented with a mixture prepared by ourselves of equal parts of coffee and chicory. The amount of caffeine obtained in this case was 0·67 per cent., and as the coffee used in the experiment yielded 1·3 per cent., that result indicated the presence in the mixture of 51·5 per cent. coffee and 48·5 of chicory. This is, we think, a sufficiently close approximation to the exact proportions taken in preparing the mixture to satisfy the requirements of any case in which a question as to adulteration would have to be decided.

It will be seen that the quantity of caffeine obtained in the above mentioned experiment was slightly in excess of the quantity that would be contained in 50 grams of roasted coffee containing 1·3 per cent. of caffeine, and thus the indicated proportion of coffee in the mixture is made to be 1·5 per cent. more than it actually was. The slight excess in the weight of the caffeine obtained in the experiment, amounting to 0·02 gram, was due to the presence of a small quantity of impurity in the shape of a brownish waxy substance that is soluble in alcohol and in chloroform. It is difficult to get rid of this without more seriously affecting the accuracy of the result by causing loss of caffeine, but with careful manipulation its presence ought not to influence the ultimate result to the extent of more than 2 per cent. This deviation from precision in the result of the test when applied for ascertaining the amount of admixture, would operate in favour of the vendor by making the amount of coffee appear to that extent greater than it really was, and as the error thus arising is in itself small for such a case, and in a direction that the vendor could not complain of, it may, we think, be disregarded for all practical purposes. It may, however, be got rid of by a further treatment of the caffeine obtained in an experiment, as the brown substance is but little soluble in benzol, so that by dissolving the product in that menstruum with heat, filtering the solution and evaporating off the benzol, the exact weight of the caffeine may be ascertained more correctly. This operation is, however, troublesome, and it may easily be attended with loss of caffeine, so on the whole we consider that it is not in fact worth having recourse to, except for the sake of obtaining in an isolated instance satisfactory proof that the results of this method of operating are trustworthy.

Some further trials were made with samples of so-called "French coffee," and the results obtained are given in the following table, together with the corresponding amounts of coffee as compared with those calculated from the amounts of extract yielded to 10 per cent. decoctions, in each case on the assumption that Belgian chicory had been used.

No. of sample.	Caffeine found.	Amount of Coffee Calculated on the basis of pure roasted coffee containing 1·3 p.c. caffeine.	Amount of Coffee Calculated on the assumption Belgian chicory had been used.
	Per cent.	Per cent.	Per cent.
1	0·52	40·0	38
2	0·68	52·3	60
3	0·54	41·6	48·6
4	0·08	6·2	7·6
5	0·24	18·8	24·4
6	0·71	55·0	76·0

The practical advantages of the proposed method of analysis, as applied to the detection of adulterants in coffee, are that the results obtained by it give at one and the same time an indication of the actual amount of coffee present in the sample examined, and also an indication of the amount of admixture independently of its actual nature, which is, for the purpose in view, a matter of comparatively little importance. By the application of this method of testing there is no difficulty in ascertaining the amount of real coffee present in any sample of ground coffee, whether sold as such or as a mixture. It will, therefore, furnish a means of detecting not only the presence of an admixture of chicory or other adulterant, but also be a means of ascertaining whether the proportion of such admixture is limited consistently with the price charged for the article, or whether it is so much in excess of that proportion as in fact to constitute an adulteration that may fairly be held to be to the prejudice of the purchaser. We, therefore, confidently commend this method of testing to the notice of public analysts for carrying out the objects of the Food and Drugs Act in regard to an article of domestic consumption which has been up to the present time subjected to systematic and injurious adulteration.

Analytical Laboratory,
13, *Fenchurch Avenue.*

* *Pharmaceutical Journal*, p. 565. We have found it advisable to dry the mixture of coffee and lime before extracting with alcohol, especially when dealing with a mixture containing chicory. The caffeine obtained should also be dissolved in a small quantity of water and the solution filtered to separate a little resinous substance before it is weighed.

STROPHANTHUS AND STROPHANTHIN.

BY A. W. GERRARD, F.C.S.

Like Elborne and Helbing (*Pharm. Journ.*, March 12), I have recently given some time to a study of the pharmacy of strophanthus, and as our experiments have been in many ways parallel, the results I obtained may have some value in confirming, or otherwise, those of the above authors.

A most liberal supply of strophanthus seed was placed at my disposal by Messrs. Burroughs and Wellcome; it agreed in characters with the seed doubtfully ascribed by E. M. Holmes to *Strophanthus Kombé*, also with the drawing figured by Elborne in his paper of March 12.

Ten ounces of seed was crushed to a fine meal, then exposed in a thin layer for four hours at a temperature of 140° F.; it thus lost 5·5 per cent. of weight, a result obtained by Helbing. The meal was now treated by slow percolation with 100 fluid ounces of light petroleum ether, and the percolate distilled. I thus obtained a residue of green fixed oil which on drying showed a yield of 31 per cent., calculated on the original seed; again practically confirming Helbing. The meal of the previous operation having been dried was further percolated with 100 fluid ounces of 84 per cent. alcohol; on distilling the alcoholic percolate there remained a pale brown resinous product weighing 5·2 per cent. of the original seed. Attention may here be drawn to the fact that Elborne, using absolute alcohol as his solvent, and under slightly different conditions as to preliminary treatment of the seed, obtained only 1·6 per cent. of a similar extract. Submitting my extract to examination, absolute alcohol was found to dissolve 92 per cent. thereof, which circumstance seemed to show that there was too great a difference between Elborne's and my results to be explained by the differences in our processes.

To settle the foregoing point another experiment was made, in which I exactly followed Elborne's method of extraction, viz., exhausting the seeds consecutively with petroleum ether, ether, and absolute alcohol; again I found that the alcoholic portion gave, on evaporation, 5 per cent. of extract. The same experiment was repeated on such other samples of seed as could be obtained, and with practically the same result. I am, therefore, satisfied that strophanthus seed, after removal of its oil, yields 5 per cent. of extractive to alcohol.

An experiment was made to find what solvent power boiling alcohol would have on the constituents of strophanthus seed. For the purpose 100 grains of seed was boiled three times with three different portions of alcohol; the solution gave, on evaporation, 36·2 grains of residue, found to be composed of 31·2 grains of oil and 5 grains of hard extract. This result shows that boiling alcohol completely removes both oil and extract from strophanthus seed at one operation. It was noticed that the oil could be easily poured from the extract, and adhering traces washed away with a very little ether. A practical result of the foregoing experiment is to show that an alcoholic extract of strophanthus seed can be made without the costly process of removing the oil by ether percolation.

Hardy and Gallois mention they obtained from the comose hairs of strophanthus seed an alkaloid; they named it ineine. Elborne found no trace of such a body in the hairs he examined. I made a number of experiments in the same direction, and am able to confirm Elborne's conclusions, so that we have good reason to doubt the correctness of Hardy and Gallois' statement.

Strophanthin.—This, the active principle of strophanthus seed, was discovered by Professor Fraser, who showed it to be a glucoside possessed of great therapeutic activity. As no precise method has been published for its extraction, and its physical characters have not been well defined, it was thought desirable these matters should be worked out. For this purpose the following experiments were made.

Ten grammes of alcoholic extract of strophanthus seed was dissolved in water, then filtered from the small amount of insoluble residue. To the solution tannic acid was added in excess, and the grey precipitate it gave collected, washed with warm water, and whilst still moist mixed with an excess of basic lead acetate. The mixture was now carefully dried and exhausted with warm alcohol; then through the filtered solution was passed a stream of sulphuretted hydrogen. On filtering from traces of lead sulphide and evaporating off the alcohol, strophanthin was left as a scaly residue. Some colouring matter being present, it was removed by resolution of the strophanthin in warm water, digestion with pure animal charcoal, filtering and evaporating.

Made as above strophanthin is a pale yellowish amorphous substance, burns without leaving a residue, and is easily reduced to powder, having some tendency to re-adhere, perhaps from absorption of moisture. It is freely soluble in water and alcohol, insoluble in pure ether or pure chloroform, but if ether or chloroform contain traces of alcohol a small portion of strophanthin dissolves. If to a strong alcoholic solution of strophanthin pure ether be added in considerable volume the strophanthin is thrown out as a fine white, somewhat flocculent precipitate, soon aggregating to a soft deposit, the whole of the strophanthin, however, cannot be separated in this way, as the alcohol always retains a portion in solution. Elborne and others have noticed that when ether is mixed with tincture of strophanthus opalescence ensues; judging from the previous observation it is most probable that the opalescence is due to separation of strophanthin.

Strophanthin has well-marked glucosidal characters. Boiled with dilute sulphuric acid, followed by Fehling's solution, cuprous oxide readily separates. Its watery solution when shaken gives much froth, a character agreeing with digitalin, senegin, and many other glucosides. Strong nitric acid does not appear to have any action on it, but a few drops of strong sulphuric acid placed on a few particles of the powder develops a green colour passing to black. With ferric chloride, acetate or sub-acetate of lead, there is no reaction; neither with silver nitrate in the cold, but on warming the silver salt is reduced. With tannic acid it gives a white precipitate soluble in excess of the strophanthin.

Professor Fraser obtained strophanthin in crystals, but a large number of experiments I made with the same object proved failures. For the purpose all the best-known solvents were tried, alone, and as mixtures; evaporation was carried out under various conditions, but no crystals appeared, therefore I fear some difficulty will be experienced in getting this active principle in a well-defined form.

To prove beyond doubt that the substance I had prepared was strophanthin, $\frac{1}{50}$ of a grain was given to a dog and proved fatal.

REACTION OF STROPHANTHIN.

BY H. HELBING,
Apotheker of the German Hospital.

Some months back I published in the *Pharmaceutische Zeitung* the statement that concentrated sulphuric acid dissolves strophanthin, changing the colour to a dark green, which soon turns to dark reddish-brown. I was able to verify this reaction in various preparations of strophanthin, which had been manufactured by three different firms. Dr. T. F. Hanauseck, of Vienna, employs it for the microchemical investigation of seeds of strophanthus for the detection of strophanthin, which is affirmed to be contained in considerable quantities, especially in the embryo (*Pharm. Post*, May 8, 1887).

I now propose the following exceedingly pronounced reaction with strophanthin:—A trace of strophanthin is to be dissolved in a drop of water and a trace of liq. ferr. perchlorid. to be added, after which a little concentrated sulphuric acid. A reddish-brown precipitate is formed, which, after a while, sometimes not before one or two hours, turns to an emerald-green or a little darker green body, which remains unchanged for a long time. Very minute traces of strophanthin may be detected in this manner.

NOTES ON CHINESE MATERIA MEDICA.*

BY CHARLES FORD, F.L.S.,
Director of the Botanical Gardens, Hong Kong,
HO KAI, M.B. ABERD., ETC.,
AND WILLIAM EDWARD CROW, M.P.S.,
Government Analyst, Hong Kong.

PRELIMINARY NOTE.

The fragmentary and often unreliable information which Europeans possess of the uses and origin of many interesting substances used in medicine by the Chinese, presents obstacles in whichever way we turn in the study of Chinese materia medica.

Besides the want of accessible information, which the authors have felt so keenly in their own personal investigations, numerous inquiries which are addressed to them individually, from time to time, point out the necessity of the subject being taken in hand earnestly by those near to, or in, the Chinese Empire. For various reasons, the authors have come to the conclusion that these investigations should be systematically taken in hand by themselves, and locally published. They trust that their efforts will be successful in awakening an interest all over China, in a study offering such immense chances for original research. They cordially invite a sharp criticism of their own work; and will gratefully receive, and thankfully acknowledge, any information given, either in correction of their own observations, or towards promoting an advance in securing the identification of drugs which have so long remained undetermined.

In the present state of our knowledge, it is impossible to adopt, with success, any natural system of classification in dealing with the various *vegetable* substances used in medicine by the Chinese. For the same reason an alphabetical arrangement is not wholly satisfactory.

The authors have been engaged for a considerable time collecting data, which, it was hoped, when grouped with the researches of other investigators, would have enabled them to have published the results of their own labours in a form accessible for easy reference, similar to that adopted by Dr. Dymock in his 'Vegetable Materia Medica of Western India;' but they have been compelled to abandon the idea. Dr. Soubeiran and M. Dabry de Thiersant, in their 'Matière Médicale chez les Chinois,' have, it is true, resorted to a classification based on a natural system. This work appeared in 1874, and, as pointed out by Dr. Bretschneider,* is simply a compilation from Dr. Porter Smith and M. Debeaux. Since the publication of these works, some further light has been thrown on the subject, and grave doubts, to say the least, are now entertained as to the source of many drugs heretofore ascribed to a particular genus or order.

Another reason why "Notes on Chinese Materia Medica" should appear in an irregular order is that a prominent position may be given at once in this Journal, to certain drugs which have of late excited some interest amongst botanists and pharmacologists in Europe.

As often as possible the drugs of a single natural order will be dealt with together. The authors in every case will affix their own number, and in addition add the number originally awarded to the 'Pên ts'ao' drugs by the late Daniel Hanbury, F.R.S. This latter step has not only been taken to facilitate reference—each of Hanbury's numbers refers to a corresponding number of an illustration† in the 'Pên ts'ao kang mu;' but is also intended to serve as a tribute to the zeal displayed by this scientist in the field of Chinese materia medica. It is to be regretted that other European investigators have not followed in the steps of Hanbury as regards numbering; it would have saved much trouble and confusion.‡

Whenever a chance occurs, a bibliographical note will be inserted with the description of each drug; it is only right that due acknowledgments should be made whereever we have benefited by the experience of others. Correspondents and those interested in Chinese materia medica will also be able to trace the source of the information in every instance. Only in special cases will a full botanical description of the plants be given.

The authors will also be happy to send to any person who may be desirous of making inquiries, specimens of drugs of doubtful origin, together with details of the information needed, in order to set at rest any point now in dispute.

1.—GELSEMIUM ELEGANS, BENTH.§ N. O. Loganiaceæ. 'Pên ts'ao,' No. 378.‖ (I.) Kou min, (II.) Yeh ko, (III.) Tu kên, (IV.) Hu mêng ts'ao, (V.) Twān ch'ang ts'ao, (VI.) Hwang t'êng, (VII.) Hwo pa hua.

The above names¶ are taken from the 'Pên ts'ao.' In the Kwangtung province it is commonly designated by the fifth of this series, and also by the name Ta ch'a yieh têng.

Gelsemium elegans has not been alluded to in any previous contribution to Chinese materia medica.

*Description.***—A glabrous, woody, evergreen twiner; stem, near the root, of a greyish-brown colour, having on the surface several warty processes; the upper part of the stem green. Leaves, opposite, 2 to 4½ inches long, ovate lanceolate, very acute at apex, entire, somewhat rounded at base on a petiole three to six lines long. Stipules, minute, fugitive, easily observed on young branches. Flowers, small, on stalks three to nine lines long, bright yellow, arranged in rather dense terminal and lateral cymes; bracts, few, linear. Calyx, small, persistent, very

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* Reprinted from advance sheets of the *China Review*, communicated by the authors.

* *Journal of the N.-China Branch of the Royal Asiatic Society*, vol. xvi., part i., p. 129.

† "This series of numbers does not exist in the original. When added in MS. it affords a convenient and ready means of reference to any particular figure."—'Science Papers,' by D. Hanbury, F.R.S., Ed. J. Ince (1876), p. 214.

‡ Seven hundred and forty-two plants are figured and described in the 'Pên ts'ao.'

§ Syn. *Leptopteris sumatrana*, Blume. *Medicia elegans*, Gardn.

‖ Figured, also, in the Chinese botanical work 'Shih wu ming shih t'u kao' (1848), No. 751.

¶ The authors are greatly indebted to the Rev. Dr. Chalmers for much valuable assistance. The romanized renderings of the Chinese sounds will always be given in the manner described by this eminent sinologue in the *China Review*, vol. xv., p. 158.

** On account of the notoriety of this plant as an agent in criminal poisoning, both in Hong Kong and Canton, full botanical characters are here given.

deeply cleft; sepals, about one line long, acute, imbricated. Corolla, rotate, eight to nine lines diameter, tube three to four lines long, surmounted by five equal lobes two and a half to three lines long, inner surface of tube marked with red spots. Stamens five, inserted on base of corolla tube and alternate with the lobes of the corolla, exserted, but shorter than the lobes; filaments equal; anthers lanceolate. Ovary stalked, on a short gynophore, tapering into a style three lines long, two-celled, containing many ascending ovules in each cell; style bicleft, each division being again slightly divided into two spreading stigmas. Fruit, a brown, dry, oblong, inflated, membraneous capsule, about half an inch long, having two opposite deep furrows running from base to apex; dehiscence, septicidal. Seeds, very small, furnished with reddish-brown, reniform and imbricated wings.

The above characters were observed on a specimen gathered on the hills overlooking Mirs Bay, at the back of the city of Kowloon in the Kwangtung province, and on another growing on Mount Gough, on the island of Hong Kong; the description of the fruit is taken from specimens gathered on the Canton West River.

Gelsemium elegans may now be seen growing in the Hong Kong Botanical Gardens.

Habitat.—This shrub grows sparingly in Hong Kong, but more abundantly on the hills of the neighbouring mainland of China.* (Champion, Wright, Wilford, Hance, etc.) In November, 1885, Mr. Westland found a large number of specimens in full flower, climbing round trees to a height of about 12 feet near the eastern base of Tai Mo Shan.† It has also been observed growing luxuriantly on the banks of the West River, about one hundred and twenty miles from Canton (Ford), near the district of Lo ting, and in ravines on the island of Lan tao, opposite the mouths of the Canton River (Westland). In the 'Pên ts'ao' (chap. xvii.) it is declared a native of the provinces of Chekiang, Kwantung, Kwangsi, Sze-chuen and Yunnan. According to Bentham, this poisonous plant also grows in Sumatra, being probably identical with *Leptopteris sumatrana*, Blume. It flowers in October, November and December, and matures its seeds in April and May.

It differs from the North American species‡ of this genus in having smaller, scentless flowers, larger leaves and smaller fruits and seeds.

Parts used, etc.—The root is the only part of the plant used in medicine. As met with in the native drug-shops in Hong Kong under the name Hu muan ch'iang; it consists of thick pieces of the underground stem with or without portions of the *true root* and rootlets attached.

A piece of the *root* in our possession exhibits the following characters. Cortical layer, thick, easily removed from central woody portion, externally of a brown colour, wrinkled, marked at intervals of from half to 1 inch by transverse cracks, extending about half way round, and as far as the meditullium. A section of the latter shows the medullary rays stretching through the yellow woody portion in a manner similar to that displayed by the root of *G. nitidum*.§ When cut with a sharp knife, the central woody part shows a waxy section.

* 'Flora Hongkongensis,' p. 229.

† This is the loftiest (about 3000 feet) of the hills on the coast of China, immediately opposite the island of Hong Kong.

‡ In the Southern United States, *G. nitidum*, Michaux (the source of the eclectic remedy *Gelsemin*) is known as wild yellow jessamine or false jasmine. We prefer to avoid the use of the terms jasmine or jessamine in the case of the China species. These names ought to have distinct generic significance, and should be applied only to plants of the genus *Jasminum*, with which *Gelsemium* was formerly classed. The value of botanical names will be seriously limited, if their indiscriminate use becomes general.

§ Syn. *Bignonia sempervirens*, Linn.; *G. sempervirens*, Aiton; *G. lucidum*, Poir. This species is figured in Bentley and Trimen's 'Medicinal Plants' (1880), vol. iii., No. 181.

There is every reason to believe that in the majority of instances, supplies of this drug are brought from the hill sides only as they are wanted. In but few shops can specimens be seen. This fact will possibly account for the scarcity of the plant on the island of Hong Kong; the careless collector doubtless destroys a shrub each time he gathers the drug, the root being the only part sought for.

Chemical Composition.—The active principle of this drug is due to an alkaloid which was first isolated in the Government Laboratory, in the course of an inquiry ordered by Her Majesty's Coroner in the early part of 1884. This alkaloid is new to chemical science, and its discovery* adds one more to the list of the strychnine or tetanus-producing group of alkaloids. Its most characteristic reaction is the production of a deep violet coloration when in contact with oxidizing agents. If the alkaloid is present in very small quantity, an observer might confound the colour with that displayed by strychnine and gelsemine under similar circumstances. In such a case the observer should apply side by side the same reagents to the alkaloids of *Strychnos nux-vomica* and *Gelsemium nitidum*—a practised eye will at once note the difference.

The following table shows at a glance the different colours produced when manganic oxide and sulphuric acid are applied to—

The alkaloid of Gelsemium elegans.	Gelsemine.	Strychnine.
A deep purplish-violet coloration, changing to one of a rich purple hue.	A damask-red colour, changing to a rich green, which latter tint is more marked at the edges.	A deep violet coloration, changing rapidly to purple, and finally assuming a cherry-red tint.

These colours are all evanescent, but that displayed by the first-mentioned alkaloid is more lasting than the others. The alkaloid of *G. elegans* is *not* associated with *gelseminic acid*, and unlike strychnine and gelsemine (?)† it will *not* bear the action of sulphuric acid at a temperature of 100° C.

The publication of other chemical features of this alkaloid is reserved for a future paper.

Toxicological Note.—In cases of poisoning by any preparation of the root of *G. elegans*, no difficulty should be experienced in detecting the active principle in the contents of the stomach, provided, first, that the victim had not vomited to any extent after receiving the dose, and second, that death had ensued within a few hours of the administration of the poison. The method adopted in the laboratory of the Government Civil Hospital is a modification of Stas's alkaloidal process. The viscera is treated with about twice its weight of absolute alcohol, acidified with tartaric acid, and digested for a few hours in a flask at a temperature of about 70° C., cooled and filtered. The filtrate is evaporated to the consistence of a soft extract, and treated with successive quantities of absolute alcohol and water, so as to free the alkaloid, if present, from as much extraneous matter as possible. The necessary evaporations may be conducted at a temperature of 100° C. The extract, after the last alcoholic treatment, is now dissolved in a little water and filtered, and the solution (acid) after being well washed with ether‡—until nothing further is removed—is made slightly alkaline with ammonia, and immediately shaken with a suitable volume of ether. The ethereal layer, which now contains the alkaloid, is removed; and this

* *Pharmaceutical Journal*, [3], xvi., pp. 95 and 496; also Hong Kong Government *Gazette*, vol. xxxi., p. 344.

† *Pharmaceutical Journal*, [3], xiii., p. 642.

‡ This washing of the acid solution with ether ought never to be omitted.

treatment having been repeated, the ethereal solutions of alkaloid are mixed, and divided into two parts. The first half should be evaporated by degrees in a small porcelain basin, and the residue after the addition of a few drops of very dilute hydrochloric acid and water, and being cautiously neutralized with ammonia, may be used for hypodermic injection into small animals, mice or guinea-pigs. The second half should be carefully evaporated to dryness on the inverted covers of three or four porcelain crucible lids and tested, in the manner already described, with sulphuric acid and manganic oxide. In practice it will be found that a small quantity of organic contamination does not interfere with the delicacy of the reaction. If the process has been conducted with that scrupulous care which should invariably accompany toxicological investigations, the *life-test* will most probably furnish confirmatory evidence, in support of that derived from the application of chemical reagents.

Uses, etc.—The author of the 'Pên ts'ao' states* that this drug is never used internally as a medicine, although preparations of the root are recommended to be applied in the treatment of boils and ulcers. According to the Rev. E. Faber, the root is sometimes secretly used internally in the Kwangtung province in certain forms of disease. The evidence of Chinese doctors in Hong Kong corroborates this statement. By some it is regarded as a specific in ringworm and leprosy.

It is, however, to its use as an agent in criminal poisoning that this plant owes its notoriety. It seems to have perplexed coroners in repeated cases that occurred in this colony between 1867 and 1871.

In 1872, application was made to the Director of the Botanical Gardens, by Dr. Richard Young, the then Superintendent of the Government Civil Hospital, for the identification of a plant—said to have been used in a case of poisoning—which, on examination, turned out to be *Gelsemium elegans*.

We have details of four well-authenticated cases since that date; three of which occurred in Hong Kong, the fourth in Canton. The three former are dealt with by Dr. Wharry in an appendix to this paper. The 1874 case is of special interest from the fact that at the coroner's inquest evidence was given to the effect that four mace (= ½ an ounce avoirdupois) of the root had been used in the preparation of the decoction, which caused the death of an adult male in two hours. The instance in 1884 possesses historical interest, from the fact that the alkaloid to which the activity of the root is due was first isolated in the laboratory of the Government Civil Hospital, and found to possess characters distinct enough to allow of its detection by chemical means in toxicological investigations.

The following particulars of the Canton tragedy, and of the fate that met the female who was alleged to have poisoned four people, are taken from a translation of the Chinese narrative of the affair by the Rev. E. R. Eichler.† The woman appears to have collected from the hills the root of the Tün ch'eung ts'ō (cut bowels grass) or Tai ts'a yip tang (great tea leaf creeper), and to have put it in a hamper in the kitchen, pending a favourable opportunity for boiling it with her *husband's* rice. While her back was turned a relative seems to have taken the root and boiled it together with some spinach in the *family* congee. With the exception of the accused all (four in number) partook of the meal and died. The woman was tried by the authorities in Canton, found guilty, and condemned to death by the Ling ch'i process, which in this instance consisted in cutting the body of the criminal into a number of pieces, four cuts being made—two on the forehead and two on the breasts—previous to piercing the heart.

* 'Pên ts'ao kang mu,' chap. xvii.

† *China Mail*, Sept. 9, 1886; see, also, letter of Government Analyst in issue of Sept. 12.

PHYSIOLOGICAL NOTE.

At Mr. Crow's request I have jotted down my experience of the Tün ch'eung ts'ō.

When I arrived in Hong Kong in February, 1873, to take charge of the Civil Hospital, I was called on to perform almost the whole of the medico-legal work of the colony, and thus speedily became acquainted with one of the uses or abuses of this plant.

In 1873, I had to examine the bodies of several women who had committed suicide with it, and I learned that the plant was well known to the Chinese, especially to the women who cut grass on the hill sides.

Having no previous knowledge of the plant, and finding no mention of it or its properties in works on materia medica or toxicology, I procured specimens and administered a fresh extract of the leaves, stem and root, to several dogs.

They all died; the poison rapidly taking effect, and producing giddiness, loss of power in the hind legs, convulsions and death.

Early in 1874 a Chinese *soi-disant* doctor was convicted of manslaughter for having with fatal effect administered a decoction of Tün ch'eung ts'ō to a Chinese shopman aged about thirty years.

It appeared from the evidence at the inquest that deceased ate a hearty breakfact at 10 a.m. and took a decoction of Tün ch'eung ts'ō at about 3.30 p.m., became giddy, with dimness of sight, loss of power in limbs, irregular breathing, and died in about two hours.

The body was examined eighteen hours after death. "Face somewhat livid; expression disturbed; pupils of fair size, conjunctivæ injected; lips and gums purple; bloody froth running from nose; under surface of body livid.

"Heart, both sides nearly empty; containing a little dark fluid blood, no clots, healthy; lungs slightly congested, trachœa and bronchi containing bloody froth. Kidneys much congested. Stomach and intestines congested. Brain-vessels full of dark fluid blood, otherwise normal. Spinal cord not examined."

In January, 1884, a Chinese (engineer of a launch), aged about thirty-five years, and his daughter aged about six years, were poisoned, presumably by the wife. At the inquest the wife stated that after partaking of tea, etc., which she had prepared, her husband and daughter became giddy and fell down insensible.

About five hours after death, the man's pupils were dilated, and there was considerable congestion of the dependent side of the head and neck: the lower side of the trunk was less congested, and the legs not at all: the conjunctivæ were injected, the lower one most. I was not present at the *post-mortem* dissection in this case, and no record of it was kept.

Mr. Crow obtained an alkaloidal extract from the tea prepared by the wife, and I tried this on two guinea-pigs, weighing 5¼ oz. and 5½ oz. respectively, with the following results:—

12.35 p.m. About eight drops injected under skin of abdomen; disinclination to move; loss of power in hind legs; inability to hold the head up; convulsions; laboured respiration; partial paralysis of all limbs, with occasional convulsions; convulsions and convulsive breathing.

1.40. Apparently not so feeble; for some time past has kept on his belly; always returning to that position when turned over; almost continuous tremors; (removed to a warmer position), tremors still the same.

1.50. Tremors violent.

1.55. Appears stronger; less tremulous; from this time he improved and recovered completely.

In the second case, at 3.9 p.m. About twelve drops injected under skin of abdomen.

3.20. Began to lose power in extremities.

3.21. Strong convulsions; turned over nearly on to his back; stiffened out; lies on side convulsed.

3.26. Strong convulsions, continuous; (tetanic spasms).

3.35. A few feeble expiring spasms.

From my experience of this plant so far, I judge that in its physiological action it differs somewhat from *Gelsemium sempervirens*, and more nearly resembles *Strychnos nux-vomica*. With further observation, the extent of these differences may be determined, but there is no facility for this at present in the Civil Hospital.

C. J. WHARRY, M.D.

Government Civil Hospital,
Hong Kong, February 22, 1887.

2.—STRYCHNOS (NUX-VOMICA?) N.O. Loganiaceæ. 'Pên ts'ao, No. 387. Fan mu pieh, Ma chien tzŭ, K'u shih pa tou,' 'Hwo shih k'ê pa tu.

The above characters are taken from the 'Pên ts'ao.' The second appears to be the most common name in Hong Kong.

In the Chinese drug shops are to be found, under one or more of the above names, the seeds of a species of *Strychnos* which are indistinguishable from the nux vomica seeds of western pharmacies. The native merchants of Hong Kong state that the supply comes from Sze chuen.*

These seeds are much larger than those furnished by the fruits of the only two species† of *Strychnos* actually known to grow in China, and although the information given in the 'Pên ts'ao' as to the plant yielding ma chien tzŭ having been introduced—the date is not given—from some Mahommedan country, points unquestionably to *S. Nux-vomica*, we must decline to ascribe it to this particular species in the absence of more precise information.

It may not be out of place to mention here, that *S. Nux-vomica* is a widely distributed plant, being found‡ in N. Australia, India, Ceylon, Burmah, Siam, and, according to Loureiro,§ in Cochin China, where it is known as *Cay cu chi*, a name which is not unlike the Hindustani term for this plant *kuchila*.‖

The Chinese do not appear to be aware of the poisonous action of these seeds on man. In the 'Pên ts'ao,'¶ contrary to expectation, we find the plant placed in the climbing group, and not in the poisonous section, as in the case of *Gelsemium elegans*. The writer states, however, that they are reputed to have a poisonous effect on dogs, and that the tree yielding them grows in Chung Chow, in the province of Sze chuen. They are recommended to be used in colds, fevers and throat affections; also in certain cases of abdominal swellings and tumours. It appears also to have been used as a remedy in diseases of the eye, and as an agent in procuring abortion.

Among the Chinese in Canton and Hong Kong this drug finds but little favour as an internal remedy. It is mostly used externally, mixed with other drugs, in the form of powders, ointments and other preparations in the treatment of sores and skin diseases.

The authors will be glad to examine the flowers and fruit of the Sze chuen variety of strychnos yielding these seeds; the *flowers* and *leaves*, should be sent either dried between folds of bibulous paper or preserved in spirit; the *fruit* should be forwarded carefully bottled in spirit or brine.

(*To be continued.*)

* See also F. Porter Smith, 'Contributions towards the Mat. Med. and Nat. Hist. of China' (1871), p. 156.

† *S. paniculata*, Champ., Hong Kong and adjacent continent; and *S. angustifolia*, Benth., Hong Kong.—'Flora Hongkongensis' (1861), p. 232. The seeds of these two species will be again referred to in a future paper.

‡ 'Pharmacographia' (1879), p. 428. This species is figured in Bentley and Trimen's 'Medicinal Plants' (1880), vol. iii., No. 178.

§ 'Flora Cochinchinensis' (1793), Ed. Willdenow, p. 154.

‖ Dymock, 'Materia Medica of Western India' (no date), p. 437.

¶ 'Pên ts'ao kang mu,' chap. xviii.

NOTES ON ESSENTIAL OILS.

(*Concluded from page* 870.)

Specific Gravity of the Principal Essential Oils, etc., of Commerce, according to Examination of Normal Pure Qualities.

Name of essential oil.	Temperature.			Remarks.
	10° C.	15° C.	20° C.	
Anise	—	0·985	0·980	
Anise, extra pure anethol . . .	—	—	0·985	At 25° (m. p. 21–22°)
Angelica root. .	0·860	0·858	0·853	
Valerian . . .	0·947	0·945	0·940	
Bergamott, I[a] Reg.	0·887	0·883	0·880	
Bitter almond .	1·063	1·060	1·055	Av. 1·060
Cajeput (green) .	0·927	0·925	0·922	
Calamus . . .	0·961	0·959	0·957	
Carvol	0·967	0·963	0·958	,, 0·962-0·965
Cassia (cinnamon flowers) . . .	1·073	1 068	1·063	
Cassia (rect.) . .	1·058	1·055	1·052	,, 1·05-1·06
Cedar-wood . .	0·948	0·945	0·940	
Cardamom (Ceyl.)	0·902	0·900	0·897	
Citronella (E. I., melissa . . .	0·900	0·896	0·893	
Lemon	0·856	0·854	0·851	
Cumin	0·925	0·922	0·918	
Cubeb	0·918	3·915	0·912	
Coriander . . .	0·872	0 867	0·864	,, 0·860-0·870
Eucalyptol p. alb.	0·935	0·931	0·928	
Eucalyptus (glob.)	0·925	0·922	0·918	
Dill	0·905	0·900	0·896	
Fennel seed, rect.	0·975	0·970	0·965	,, 0·965-0·975
Ginger	0·885	0·882	0·878	
Spearmint, German, rect. . .	0·930	0·925	0·922	
Caraway, double rect., from Germ. field caraways .	0·905	0·900	0·896	
Caraway, double rect., from Dutch caraways . . .	0·911	0·908	0·905	
Mace	0·858	0·855	0·852	
Mirbane . . .	—	—	1·200	
Clove stalks . .	1·065	1·061	1·057	,, 1·060-1·065
Cloves	1·065	1·062	1·059	,, 1·060-1·065
Peppermint, F. S. and Co. .	0·906	0·903	0·901	,, 0·900-0·910
,, Mitcham . .	0·905	0 900	0·898	,, 0·900-0·905
Safrol	1·109	1·104	1·100	
Sassafras . . .	1·068	0·065	1·060	,, 1·05 1·07
Mustard, gen. ess.	1·030	1·025	1·020	
Mustard, artificial	1·025	1·020	1·016	
Sandal-wood (super. E. I.) .	0·978	0·975	0·973	
Star-anise . . .	0·990	0·985	0·980	
Juniper (db. rect.)	0·863	0·858	0·855	
Wintergreen (nat.)	1·189	1·185	1·182	
Wintergreen (art.)	1·192	1·187	1·183	
Cinnamon, Ceyl. .	1·035	1·030	1·027	,, 1·03-1·035

Variations in the above figures may occur in the third place of decimals, without suspicion of sophistication being justified on that account, but greater deficiences are excluded.

The following paragraphs refer to some new essential oils:—

Asarum Oil.—A distillate from the root of *Asarum Europæum*. Three hundred and fifty-two kilos gave 3·8 kilos of essential oil, containing a considerable quantity of asarum camphor (asaron), which partially separated at the ordinary temperature. It has recently been investigated by Professor Poleck, of Breslau (*Pharm. Journ.*, [3], xv., 82).

Poplar-buds Oil (*Ol. gemmæ populi*).—A distillate from dried poplar buds. Yield of oil about one-half per cent. A light yellow ethereal oil, having a beautiful odour, somewhat recalling that of chamomiles. It boils almost constant between 255° and 265° C., and has a sp. gr. at 15° C. of 0·900.

Southernwood Oil (Ol. Artemisiæ).—Distillate from the herb of *Artemisia Abrotanum.*

Southernwood Root Oil (Ol. Rad. Artemisæ).—Distillate from the root of *Artemisia Abrotanum.*

Cloveroot Oil (Ol. Rad. Caryophyllatæ).—Distillate from the root of *Geum urbanum.* This is described as an oil having an extremely fine and agreeable cinnamon-like odour, and a spicy taste, from which crystalline constituents separate. It is thought that if it can be prepared at a low price it would prove practically useful.

Pimpinella Oil (Ol. Rad. Pimpinellæ).—Distillate from the root of *Pimpinella Saxifraga.* Has the taste and odour of the root.

From Japan have been received the two following essential oils :—

Kiku Leaves Oil.—A colourless oil, having a camphoraceous odour, somewhat recalling that of eucalyptus oil. It would not appear, however, to be specially useful, since this kind of odour is already exceedingly well represented. Sp. gr. 0·885 ; boiling point 165–175° C.

Kiku Flowers Oil.—A colourless oil, with a not unpleasant odour, which might find use if obtainable at a low price. The first portion that distils over at 180° C. has a fragrant agreeable odour ; the further fractions which pass over up to 220° C. are camphoraceous and not specially pleasant. The botanical name of the plant from which these two oils are derived is not yet known.

Massoy Oil.—Messrs. Schimmel have also received from New Guinea a specimen of the aromatic massoy bark, which is very rich in an essential oil having an odour recalling those of cinnamon and sassafras. It has recently been pointed out by Professor Flückiger that although this bark was known to Rumphius in 1680, it is at present forgotten in Europe. The tree from which it is derived is one of the Lauraceæ, and grows in southern New Guinea. It has deen described by Beccari, under the name *Massoia aromatica*, the new genus standing between *Cryptocarya*, *Ravensara* and *Sassafras.*

Borneol.—According to experts borneol may find employment in perfumery. Its odour is said to have some resemblance to that of ambergris. Should it come into demand it could be produced cheaply, the artificial borneol not being distingui-hable from the natural.

Coumarin.—Each kilogram of coumarin is said to represent the aroma of 60 kilos of fine tonka beans, and the compound is claimed to present advantages over all other coumarin drugs. Next to tonka beans in strength of aroma comes the "wild vanilla," consisting of the leaves of *Liatris odoratissima.*

Eucalyptol.—This compound has been used during the last few months, especially in France, as a subcutaneous injection in the treatment of phthisis (see before p. 803), a purpose for which a pure preparation is essential. It may be purified by Wallich's method, which consists in passing into the crude eucalyptol, placed in a freezing mixture, a current of hydrochloric acid gas ; this causes it to solidify to a crystalline paste, which when pressed, dried, decomposed with water, and rectified yields a product with a constant boiling point at 176° C., and a specific gravity of 0 930 at 15° C. By the use of a freezing mixture it can be obtained in beautiful long needles, melting at about −1° C., and this property is recommended as the best evidence of purity. It is colourless, has a pure camphoraceous odour, and should dissolve without residue in the liquid paraffin, which would indicate its freedom from water.

Heliotropin.—This synthetic compound is affirmed to be superior to all mixtures for imitating the delicate and unstable odour of the heliotrope, and to be comparable to the flowers. Among other uses it is introduced into mouth washes, in which it is said to act as an antiseptic.

Thymol.—It is reported that thymol is now used in the United States in the preparation of dry plates for photographers.

MEDICATED TABLETS.*

BY G. H. DUBELLE, PH.D.

Medicated tablets enter largely into the stock of the druggist, and contribute in no small degree to the general profits of his business. I have thought it to be expedient, therefore, to publish in the following certain directions for their manufacture, which, when strictly followed, can be relied on.

I shall first commence with the ingredients which enter into their composition, with some hints as to their proper selection when not well known as to quality ; their making, mixing and working, and afterwards will give a number of formulas for the production of various kinds of tablets.

Sugar.—As sugar is the basis in the making of these tablets, it is essentially necessary to study carefully and observe the difference in its qualities, the changes which it undergoes, or effects, when combined with other ingredients in the process of manufacturing medicated tablets. The best refined sugar should be white, dry and of a brilliant appearance when broken, and as close in texture as possible.

Chocolate.—The French vanilla chocolate is, in general, the most esteemed. Good chocolate should be of a clear red brown. As the colour is paler and darker, so is the article more or less good. The surface should be smooth and shining. If this gloss comes off by touching, it indicates an inferior quality, and it is probably adulterated. When broken, it ought to be compact and close, and not appear crumbly. It should melt gently in the mouth when eaten, leaving no roughness or astringency, but rather a cooling sensation, on the tongue. The latter is a certain sign of its being genuine.

Extract of Liquorice.—It is of the greatest importance that this should be strictly pure and of the finest quality. For preparing the same refer to any pharmacopœia.

Extract of Malt.—In establishments where this is manufactured on a large scale, the liquid extract of malt (1-5) is made by water-bath percolation, at a temperature of 170° F. The percolate is filtered and evaporated as quickly as possible.

Flower Conserves.—Convert 1 part of fresh leaves of any flower into paste by rubbing same with a marble pestle in a marble mortar, and then work 2 parts of powdered white sugar into it. Place in jars with air-tight covers. Fruit conserves are made in the same way.

Mucilage.—Dissolve, by the aid of heat, 1 part of gum arabic in 2 parts of water, and when solution is effected add 1-16 part of glycerin.

Drugs and Essences.—It is hardly necessary to mention that only first class goods should be used ; therefore great care must be taken in the selection.

Mixing the Ingredients.—In making the medicated tablets the different ingredients should be well mixed with the sugar, in order that each tablet may have its due portion. If this is not attended to the perfect distribution of the compound parts cannot be depended upon, and one tablet may contain double or treble the quantity of medicinal matter it ought to have, whilst others contain comparatively none ; therefore those that have the greatest portion may often prove injurious by acting contrary to what was intended.

Making of Tablets.—Make a "bay" with the prepared sugar (medicated, fruit, conserve) on a marble slab, into which pour the mucilage by degrees, and mix thoroughly into a paste, flavouring the mass with the flavouring extract. Some makers prefer mixing the mucilage and

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* From the *Druggists' Circular*, March.

prepared sugar together at first in a mortar, but as it is indifferent which way is pursued, that may be followed which is most convenient. Roll out the paste on a marble slab until it has the required thickness, using starch powder to dust it with to prevent the sticking to the slab and pin. Before pressing them out strew or dash over the surface with powder, mixed with sifted sugar, and rub it over with the heel of the hand, which gives it a smooth face. This operation is termed "facing up." Brush this off and again dust the surface with starch powder, cut out square tablets of 15 grains and place in wooden trays. Put them in the hot closet to dry. All tablets are finished in the same manner.

Hot Closet.—This is a useful and indispensable appendage in manufacturing tablets, etc.; it is generally constructed like a cupboard in the recess of a wall. The walls or sides should be composed of bricks or wood lined with tin or sheet iron to retain the heat, with pieces of wood nailed or fastened in the sides, about four inches asunder, to form a groove for trays or boards to rest on, which is necessary for the drying of tablets, etc.; there should be a few shifting shelves, and the door must be made to shut close, with a small door at the top to let out any excess of heat. It may be heated by means of many of the modern gas stoves.

Almond Blossom Tablets.

	Parts.
Powdered double-refined sugar	600
Almond blossom conserve	300
Mucilage	70
Extract of almond blossom	30

Asthma Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of grindelia robusta	150
Extract of yerba santa	150
Mucilage	70
Tincture of tolu	30

Bronchine Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of liquorice	220
Powdered cubebs	80
Mucilage	70
Tincture of tolu	10

Catarrh Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of liquorice	120
Mucilage	70
Powdered senna leaves	60
Powdered anise seed	60
Flowers of sulphur	60
Essence of fennel	30

Catechu Tablets.

	Parts.
Powdered double-refined sugar	700
Powdered catechu	120
Mucilage	70
Powdered orris root	60
Powdered vanilla	20
Triple extract of roses	10

Cachousin Tablets.

	Parts.
Powdered double-refined sugar	400
Powdered vanilla chocolate	400
Powdered willow charcoal	100
Mucilage	70
Tincture of cinnamon	20

Cherry Blossom Tablets.

	Parts.
Powdered double-refined sugar	600
Morella cherry fruit conserve	300
Mucilage	70
Extract of cherry blossom	30

Citrine Tablets.

	Parts
Powdered double-refined sugar	600
Powdered citric acid	300
Mucilage	70
Essence of lemon	30

Coca-Malt Tablets.

	Parts
Powdered double-refined sugar	600
Extract of coca	120
Extract of malt	120
Mucilage	70
Rose conserve	60
Extract of orange flower	20
Triple extract of roses	10

Constipation Tablets.

	Parts.
Powdered double-refined sugar	300
Powdered vanilla chocolate	300
Calcined magnesia	300
Mucilage	70
Tincture of vanilla	20
Essence of cinnamon	10

Digestive Tablets.

	Parts.
Powdered double-refined sugar	600
Subnitrate of bismuth	120
Saccharated pepsin	90
Pancreatin	90
Mucilage	70
Essence of aromatic spice	30

Dyspepsia Tablets.

	Parts.
Powdered double-refined sugar	600
Powdered fennel seed	200
Powdered calamus root	100
Mucilage	70
Essence of peppermint	30

(*To be continued.*)

MEDICAL INTERESTS CONCERNED IN THE PROPOSED LEGISLATION FOR CHEMISTS.

The following article on the Pharmacy Acts Amendment Bill appeared as an "editorial" in the *British Medical Journal* for May 7: –

"We print in another column the Bill which is being promoted in Parliament by the Pharmaceutical Society of Great Britain for the better instruction and training of pharmaceutical chemists. The Bill is a short one, and is much to the point; in its general objects there is much which the medical profession will approve, and by the realization of which the public will benefit. But, as we shall presently point out, there is some need of amendment and some reason for caution in accepting the Bill in the shape in which it is now put before the House of Commons.

"It will be well first to review the present position of pharmaceutical education and examinations, and to explain the operation of the proposed measure, and the good results which it is intended to produce.

"The chief object of the formation of the Pharmaceutical Society in 1841 was the promotion of the technical education of chemists and druggists; but, though its work has since been always in that direction, the establishment of a uniform educational system still remains unaccomplished. The Society's expenditure in maintaining courses of instruction in London by lectures and practical laboratory work has amounted to many thousands of pounds; and, in addition, considerable assistance has been rendered to educational organizations in the

provinces; but from the absence of any compulsory regulation requiring that persons intending to pursue the calling of a chemist and druggist should go through a suitable course of scientific education and technical training, the opportunities thus provided have not been very generally taken advantage of; and, as regards the provinces, it has been impossible to maintaiu pharmaceutical schools, because students could not be obtained.

"The only approach to a provision for technical training which now exists is the apprenticeship; but, for various reasons, that has proved to be insufficient for insuring the requisite education. This is most conclusively proved by the fact that out of the candidates who present themselves for examination to obtain legal qualification to carry on business, no fewer than 60 per cent. fail to pass, although they must have all been engaged for not less than three years as apprentices or pupils. The subjects of this examination are prescriptions, practical dispensing, pharmacy, materia medica, botany and chemistry. It is specially provided by the Pharmacy Act, 1852, that these examinations shall not include the theory and practice of medicine, and they are conducted under the supervision of an officer appointed by the Privy Council. Hence it is evident that systematic and efficient pharmaceutical education—the chief object of the incorporation of the Pharmaceutical Society—has yet to be provided for, and past experience shows that there is but slender reason for expecting its realization so long as the mode of attaining it remains a matter of option.

"Under this view of the subject the Society's Council has for several years past been engaged in formulating an educational scheme, and has devised Bye-laws by which it was to have been put in force. Those Bye-laws have, however, been held by the Privy Council to exceed the present powers of the Society, and consequently it has become necessary to go to Parliament for such an extension of power as will admit of an educational system being established. Should this be accomplished it is believed it would favour the establishment in various parts of the kingdom of schools at which the necessary scientific and technical instruction would be obtainable with facility and at no great expense. The present action of the Council is but a natural and necessary sequence of the policy followed by the Society from the time of its incorporation, and sanctioned from the point of view of the public interest by existing Acts of Parliament. It in no way seeks to establish a monopoly beyond that which naturally appertains to competence for the exercise of a business which so closely affects the public health and safety.

"So far, good; but when the wording of the Bill is scrutinized, certain objections occur which involve questions of great importance, such as the medical profession and the medical corporations would do ill to disregard. All the members of the pharmaceutical trade and profession are by no means so free from unjustifiable pretensions and usurpations as the members of the Council of the Pharmaceutical Society; nor do the opinions or practice of the members of that Council, which we assume to be immaculate in respect to counter prescribing, medical practice and medical visiting, either govern or even influence a very large proportion of the members. In this respect, indeed, the Council has never attempted, we believe, to exercise, even if it possess, any restraining powers; nor is it likely that it ever will attempt to do so, or that the majority of its members would allow it to do so if it wished. It follows, that any step must be viewed with great suspicion which gives a parliamentary or public sanction to the extension of quasi-medical teaching to a body of men who, without medical training, are in fact inclined only too largely and too frequently to usurp medical functions to the grievous danger and injury of the deluded persons who are already too much disposed to identify every druggist's blue and red bottles as the insignia of "a doctor's shop," and to flock there accordingly, for a little cheap and perilous doctoring. If now we examine the clauses of this well intentioned Bill, we see that it proposes to require certificates of a curriculum including courses of chemistry, botany, and materia medica. Materia medica is a very elastic term; it frequently includes, and may easily be made to include, a large mass of medical and therapeutic principles and details; very useful and essential additions to the anatomical, physiological, pathological, and clinical basis of a medical education, but very useless, and even very dangerous, to a person who has not received that basis of instruction, and who is not intended for the medical profession. In the Pharmacy Act of 1852, to which the Bill is an amendment, it is, as we have said, provided that the examinations of the Pharmaceutical Society shall not include the theory and practice of medicine, and an inspecting physician is appointed by the Privy Council whose business it is, among other things, to see that this restriction is not infringed. It seems to us obviously necessary that a like restriction be introduced into the provisions as to the curriculum of education in preparation for that examination which this amending Bill proposes to lay down and to make compulsory.

"Moreover, the use of the word materia medica in such a connection is likely to be ambiguous, and therefore misleading. We assume that what is meant by the promoters of the Bill is instruction in the physical, chemical, and pharmaceutical characters of the drugs. This is, we believe, more correctly expressed by the word Pharmacognosy; but it would probably be better to use words defining and stating in plain English the character and scope of the instruction to be given.

"There is one other point to which attention should be given. Unrestricted and unqualified power is given to the Council of the Pharmaceutical Society to dispense with the whole or any part of the curriculum which the Bill declares to be necessary, and purports to make obligatory. This is a little too sweeping.

"Assuming, as is involved in the premisses of the Bill, that such a curriculum is necessary and of public utility, the body which will hereafter regulate the curriculum, conduct the examinations, and receive the fees, should not possess this large power of uncontrolled dispensation. It is obvious that the Privy Council should retain and exercise the powers, first, of approving the details of the scheme of lectures and of the curriculum; and secondly, of revising the discretion of the Council in exercising its dispensing and annulling powers.

"Under all these headings, representations will be made to the Privy Council and to the General Medical Council by the Chairman of the Parliamentary Bills Committee of the British Medical Association, and Mr. Ernest Hart is already in communication with the authorities on the subject, in accordance with the views of that Committee. The General Medical Council, which is a "Council of education and registration," is very shy of going outside its dry official duties; but possibly it may think that the introduction of a Parliamentary Bill for the construction of what may easily be converted into a system of imperfect and quasi-medical education of a class of gentlemen already too much disposed to presume mischievously on their supposed medical knowledge may be fairly held to come within their purview as the guardian of medical education. We commend the subject to their notice and to that of the profession. The Apothecaries' Society has a direct interest and duty in relation to this matter, and it might, we think, add to its usefulness to the profession and the public by assisting us to take measures in this matter *ne quid medicinæ respublica detrimen i capiat.*"

The Pharmaceutical Journal.

SATURDAY, MAY 14, 1887.

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THE PHARMACY ACTS AMENDMENT BILL FROM A MEDICAL POINT OF VIEW.

CONSIDERING the intimate relations existing between the practice of pharmacy and the medical profession it is, in a general way, satisfactory to find pharmaceutical affairs receiving attention from a medical point of view, as it appears, from a leading article in the *British Medical Journal* of last week, is the case with regard to the Pharmacy Acts Amendment Bill before Parliament. As this article offers many points of interest for the consideration of our readers we have reprinted it in order that it may not escape their attention. In referring to the object and principle of the Bill they are described as presenting much that will be approved of by the medical profession, and that would be beneficial to the public. The general position of the Pharmaceutical Society in regard to the promotion of education is fairly stated in a *résumé* of the work that it has done with that object, of the degree of success already achieved, and of the necessity that has been found to exist for bringing more direct influence to bear upon pharmaceutical students to ensure their better instruction and training. We feel sure that all members of the Society who take an active interest in its work and progress will read this portion of the article with a grateful sense of satisfaction that the Society's position has been so justly appreciated by a representative of the medical profession. But in other parts of the article it will be seen that there is some danger of misunderstanding as to the real intention and possible effects of the measure before the House of Commons. While recognizing that the chief object of the formation of the Society was the promotion of the technical education of chemists and druggists, and that the present action of the Council in seeking increased powers to that end is but the natural sequence of the Society's previous work, the opinion is expressed that there is some reason for caution in accepting the Bill in the shape in which it is now put before the House, and that, as judged from a medical point of view, it requires some amendment. The reasons assigned for this opinion are, we think, to a very great extent, not such as will be found on consideration to support it as far as the Society is concerned, but they merit attention inasmuch as they throw a light upon the causes of that feeling of jealousy which in this country too frequently stands in the way of harmonious relations between medical men and pharmacists. In the first place it is urged that by no means all the members of the pharmaceutical body are free from liability to be charged with what are described as unjustifiable pretensions and usurpations, and under these terms there is no difficulty in recognizing reference to the practice of counter prescribing and medical visiting. So far as the members of the Society are concerned it is indeed assumed by our contemporary that they are immaculate in these respects, but at the same time this admission is qualified by the remark that a very large proportion of those in the trade are not governed or even influenced by the opinions or the practice of the Council. Whatever amount of justice there may be in these remarks we may at least point out that the mischief wrought by the "doctor's shop" cannot be laid at the door of the pharmacist; but red and blue bottles, which are its delusive insignia, are in no small degree a cause of heartburning to chemists and druggists, and even a potent provocation to engage in practices they might otherwise be willing to avoid. But it is unnecessary here to refer more particularly to the confusion of pharmaceutical and medical functions which is the source of so much discontent on both sides, except for the sake of pointing out that on this occasion again it has given rise to a feeling of suspicion as to the Bill now before Parliament.

The most important of the suggestions offered by our contemporary as to the need for amendment of the Bill is founded upon this basis of suspicion, that the measure might pave the way to interference with the functions of medical men, and that if passed, its provisions might be made use of in order to justify practices which medical men regard as unjustifiable, and that have never been defended or upheld by the Pharmaceutical Society. Fortunately, that basis is as shadowy and unreal as suspicion commonly is—materia medica is the term which has served to create this alarm. It figures in the list of subjects for the study of which the Pharmaceutical Society now seeks to obtain power to lay down regulations. True, this subject has always formed a part of the course of study required of pharmaceutical students, and in the regulations of the Board of Examiners, published in the Society's Calendar, the definition of its scope is sufficiently precise to make it evident that it is a natural and indeed necessary part of the competent practical knowledge which the Pharmacy Act declares that persons known as chemists and druggists must possess. But our contemporary, looking at the term materia medica from a medical point of view, not unnaturally remembers that in the medical schools attached to hospitals it comprises—if it does not specially denote—therapeutics. At any rate, he

considers materia medica a very elastic term that might easily be made to cover the teaching of many matters appertaining to the practice of medicine. It is for this reason only that it is held that any step giving parliamentary sanction to an extended system of teaching a body of men, some of whom are inclined to usurp medical functions, must be viewed with suspicion. As we have shown already, this is a purely imaginative reason, and that to some extent that has been perceived would appear from the subsequent reference to the provisions of the Pharmacy Act, 1852, that the Society's examinations shall not include the theory and practice of medicine, surgery or midwifery. Those provisions would, we apprehend, govern any regulations to be made in accordance with the terms of the Bill now before Parliament, just in the same manner that they apply now to the examinations held under the Act of 1868. It may therefore be taken as certain, that so far as the article in the *British Medical Journal* has in this respect pointed to any need for amendment of the Bill, it has been under misapprehension of the real facts of the case.

We understand that some members of the medical profession entertain the opinion that the Society's Bill would have the effect of creating a monopoly in pharmaceutical teaching, and would impose upon young men the necessity of coming up to London or going to some large town where they would have an opportunity of attending courses of instruction and lectures. We fail to perceive in what respect this necessity, if it existed, could be urged as an objection to the powers which the Society now seeks to obtain. If it be admitted that the knowledge of certain subjects specified in the present Pharmacy Acts is necessary for chemists and druggists, and we have not yet heard this disputed, it is clearly expedient that persons who seek qualification under the Act should have adequate opportunity of obtaining the required knowledge. At the present time they either have not had such opportunities or they have not taken advantage of them. This is demonstrated by the failures in the examination, and apparently the only natural inference is that the attendance of courses of instruction must be made compulsory. If it could be shown that the persons presenting themselves for qualification possessed the necessary knowledge it might be contended that it was of secondary importance how it was acquired; but experience has proved just the contrary, that with the majority there is neither a sense of the need for instruction nor the desire to obtain it in any way, the only idea being to obtain qualification. It is under this state of things that young men are subjected to the hardship of being mulct in expenses of repeated examination and continued renewal of that superficial preparation for it which now does duty in the place of real instruction. One of the first consequences of the passing of this Bill may be expected to be the provision of opportunities for instruction all over the country, and those who place their sons as apprentices will naturally take care to ascertain that they do so where the necessary opportunities for instruction can be obtained. Under existing conditions, there can be no hope of such opportunities for instruction being provided at all in very many places, and even in large towns it is almost a matter of accident that this can be done. In most instances where it has been attempted the result has been failure, and these undoubted facts constitute an argument in favour of the Society's Bill, to which there has not as yet been any kind of valid objection raised.

This being the last opportunity we shall have before the dinner to be held in aid of the Benevolent Fund, we have been requested to state that up to the present time the number of donors who have announced their intention to contribute to the Fund amounts to only 161. If the collection of a sum comparable with the previous decennial collections is to be realised on the present occasion, the contributions already sent in to the Secretary will require to be largely supplemented, and as it is desired to prepare a list of donors and donations to be read at the Dinner, those who intend to contribute should do so without delay.

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A meeting of the Subscribers to the Redwood Testimonial Fund will be held on Wednesday next, May 18, at 4 p.m., at 17, Bloomsbury Square, when the portrait of Emeritus-Professor Redwood, painted by Mr. Sydney Hodges, will be presented to the Pharmaceutical Society on behalf of the Subcribers by Dr. A. B. Garrod, F.R.S., F.R.C.P.

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The discussion in the House of Commons on the motion to go into Committee on the Pharmacy Acts Amendment Bill has been further adjourned until Tuesday, the 14th of June.

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Attention is directed to the official announcement on page 934 respecting the Silver Medal which will be awarded next year for the best herbarium collected by an Apprentice or Student of the Pharmaceutical Society, in any part of the United Kingdom, between the first day of January, 1887, and the first day of July, 1888.

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We have received a letter from a correspondent requesting to be permitted to advocate the claims of one of the candidates for membership of the Council, on the ground of his especial fitness for redressing the crying grievances which pharmacists labour under. Although it is assumed by our correspondent that "the present venerable Council is either incapable or unwilling to consider" these grievances, we cannot depart from the established rule of this Journal never to take any part in the endeavour to influence the Council elections. The power to do that is in the hands of the members, and if they abstain from or neglect the exercise of their constitutional privileges in this respect the fault is their own. But we may add that it seems absurd to assume that a body constituted, as the Council is, of members

from all parts of the kingdom, would ignore any grievances affecting their constituents with which there is any reasonable prospect of being able to deal successfully. Notwithstanding occasional vague talk of combined and sustained effort to redress certain grievances, such as that of the unfair competition of bogus companies and stores, there is still a total absence of any clear indication of the means by which such a result is to be effected. At any rate the idea that protective legislation can be looked for because the spirit of the Pharmacy Act of 1868 is assumed to establish a claim to protection, is one that we cannot perceive any ground for.

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In reference to the possibly impending dissolution of the Chemists and Druggists' Trade Association, a suggestion has been forwarded to us that the Pharmaceutical Society might take in hand to continue the work of the Association as a distinct department, and charging non-members a five-shilling subscription. The reasons assigned for this proposition are the assumption that the work could be done cheaper at Bloomsbury Square than by a totally independent organization, and the belief that such a course would tend to make the Society much more popular with the trade. Though we believe this view has been expressed with all sincerity, we are quite unable to concur with it, for apart from the great difference between the work of the Society and that properly appertaining to such a body as the Trade Association, the experience of the latter body has not been so favourable as to excite any keen desire to assume its functions. Though the Pharmaceutical Society has itself much reason to complain of deficient support from members of the trade, the fact of its appealing to higher sentiments than immediate regard for direct trade interests may be a reason that this is the case; but it is most discouraging to observe that an association which lays itself out especially for the protection of trade interests should have met with at least an equal want of support from more than a mere fraction of the trade. If it were not that this has been the case in such a marked degree it might probably have been the most feasible plan for the officers of the Association to continue the work of that body on the basis of a limited liability company. With the general support of the members of the trade and a five-shilling subscription that ought to be possible with a body numbering probably ten thousand individuals actually engaged in business.

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By the courtesy of the Registrar to the Medical Council we are in receipt of copies of "The Medical Register" and "The Dentists Register" for 1887, which are now ready. Both of the Registers, we are informed, have been subjected to the most thorough revision, and no effort has been spared to make them complete. In the introductory part of the Medical Register the Medical Act of 1886 has now been added to the earlier Acts, and there is also a table showing the qualifications in Sanitary Science which have become registrable under this new statute. It also includes the usual statistical information, from which we learn that the total number of names on the Medical Register at the beginning of the year was 26,452, or an increase of 454 on that of the previous year. A new table has been introduced, showing the number of practitioners resident in each division of the United Kingdom. The Dentists Register now contains 5207 names.

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According to Mr. Consul Sharpe, the adoption in Costa Rica of the decimal metric system, which came into force in July last, has been effected without trouble, the country people having readily accustomed themselves to the new weights and measures.

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The camphor trade in Formosa, which had almost become extinct, has recently been taken under the protection of the Chinese authorities as a government monopoly. Mr. Consul Giles states that for some years the collection has been so scattered that it has been impossible to obtain camphor in Formosa in remunerative quantities; the Government has therefore now undertaken to establish fixed depôts for receiving the scattered supplies, which will be paid for at a certain rate and resold at a fair profit for export.

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The controversy on the subject of the testing of quinine sulphate which has of late been so actively carried on has just received a further addition in the shape of an article by Dr. O. Hesse, which is published in the current number of the *Pharmaceutische Zeitung*. In this article Dr. Hesse reviews the several methods of testing which have been suggested by de Vrij, Paul and Schafer. We hope soon to have an opportunity of publishing a translation of the article in this Journal.

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At the next meeting of the Chemical Society, to be held on Thursday, May 19, papers will be read on "The Formation of Hyponitrites," by Wyndham R. Dunstan and T. S. Dymond; "Ozone from Pure Oxygen," by W. A. Shenstone and J. T. Cundall; "Thermal Results of Neutralization, and their Bearing on the Nature of Solution and the Theory of Residual Valency," by S. U. Pickering; and "The Action of Metallic Alkylates on Mixtures of Ethereal Salts and Alcohols," by Professor Purdie.

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An extra meeting of the London Section of the Society of Chemical Industry will be held in the Chemical Society's Rooms, Burlington House, on Monday, the 16th inst., when the papers under consideration will be a "Note on the Action of Zinc Chloride on Castor Oil," by Dr. C. R. A. Wright; "New Methods of Estimating Moisture in Superphosphates and Similar Fertilizers," by Mr. J. Ruffle; and "Further Notes on English grown Tobacco," by Mr. A. Wingham.

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The next meeting of the School of Pharmacy Students' Association will take place on Thursday, May 19, when a paper will be read on "Butyl-Chloral Hydrate," by Mr. J. J. Thomas, and Mr. J. G. Tingle will give a Report on Analytical Chemistry.

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A botanical excursion, in connection with the Manchester Pharmacy Students' Association, to the neighbourhood of Blackstone Edge and Hollingworth Lake, has been fixed for Saturday afternoon next, the 21st inst.

Transactions of the Pharmaceutical Society.

BOTANICAL PRIZE FOR 1888.

A Silver Council Medal is offered for the best Herbarium, collected in any part of the United Kingdom, between the first day of January, 1887, and the first day of July, 1888; and should there be more than one collection possessing such an amount of merit as to entitle the collector to reward, a second prize, consisting of a Bronze Medal, and also Certificates of Honour and Merit, will be given at the discretion of the Council. In the event of none of the collections possessing sufficient merit to justify the Council in awarding medals or certificates, none will be given.

Competitors must be Apprentices or Students of the Society, and under twenty-one years of age.

The collection must consist of phanerogamous plants and ferns, arranged according to the natural system adopted in some work on British Botany (such as that of Babington or Hooker), and be accompanied by lists arranged according to the same method.

Each collection must contain not less than 300 specimens, and the name of each plant, its habitat, and the date of collection must be stated on the paper on which it is mounted.

Each collection must be accompanied by a note, containing a declaration, signed by the collector, and certified by his employer, or a pharmaceutical chemist to whom the collector is known, to the following effect:—The specimens which accompany this note were collected by myself, between the first day of January, 1887, and the first day of July, 1888, and were named and arranged without any other assistance than that derived from books.

The merits of the collections will be estimated not so much by the number of plants as by the correctness with which they are named, and by their being typical specimens. The manner in which they are preserved and mounted will also be taken into account.

The collections must be forwarded to the Secretary of the Society, 17, Bloomsbury Square, so that they may be received by him not later than the first day of July, 1888, indorsed "Herbarium for Competition for the Prize." After the Prize Distribution in October collections will be retained one month, under the care of the Curator of the Museums, and then returned to the collectors, if required.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 4th instant, at the Society's Rooms, No. 4, Harcourt Street, Dublin, at three o'clock.

The President, Mr. William N. Allen, in the chair.

The other members of the Council present were Messrs. Brunker, Hodgson (Treasurer), Pring, Grindley, Wells, Ray, Simpson, Dr. Evans, Professor Tichborne and Dr. Collins.

The first business on the paper was the adjourned discussion on the following motion which had been proposed by Mr. Brunker and seconded by Mr. Wells on the last day of meeting:—"That the regulations laid down for attendance on a course of practical chemistry be amended as follows:—For the words 'been present at least three-fourths of the working days of said course,' read 'actually worked at the bench for one hundred hours during said course.'"

The President said that as it was admitted that the length of time spent in working at the bench should be increased, the discussion might now be fairly confined to the extent to which that should be done.

Dr. Evans: Would it not be well to go on with some of the other business on the paper first, in order to give members time to come in?

The President: We have a rule that the business must be taken in the order in which it appears on the paper.

Mr. Wells: We should not forget that members ran away on the last day. They ought to be here now.

The President ruled that the discussion of the motion should go on.

Mr. Grindley observed that at the time the existing regulation was made the Council was not aware that a certificate in practical chemistry could be taken out by the student in the short time that it was now known it could be done. The Government Visitor had also reported very strongly that some alteration should be made in the existing rule.

Dr. Evans said that in the Caermichael School the summer course consisted of thirty-six days of two hours each, and it lasted three months; and if any candidate attended three-fourths of the course he got his certificate.

The President: Mr. Pring, can you give us any information?

Mr. Pring said there was a very good evening school in Belfast—that of Mr. Barclay. He examined his pupils very carefully, and as a rule they passed very fair examinations in chemistry. He could not tell the number of hours they had to put in.

Mr. Wells said a statement of his that young men in Belfast attended six nights in the week at practical chemistry had been contradicted. He was in a position to state that Mr. Speers, in Holywood, near Belfast, had a laboratory open on five nights of the week from six o'clock until ten. On those nights he attended himself; and on the remaining sixth night any pupil could get the key and work in the laboratory. He (Mr. Wells) spoke from the experience of a young man in his employment.

Professor Tichborne rose to order. He appealed to the good taste of Mr. Wells whether it would not be better to discuss this question on its own merits, without going into the merits of individual schools.

The President: I think Mr. Wells is perfectly in order. What he has been saying is in reply to a question of mine as to what rule has been observed in different schools.

Mr. Wells said the school of the gentleman he had named was not one of those recognized by the Society: but several young men who learned their chemistry in it had passed very creditable examinations.

Professor Tichborne: Why did we not recognize it?

Mr. Wells: He never asked us.

Mr. Pring: I rather think he did, and that we refused him.

The President said it was not the Society, but the Privy Council that refused to recognize the school.

Mr. Wells said the school which the Society did recognize in Belfast, namely, the Workman's Institute, was open on three nights in the week from seven till ten o'clock, for three months. It had been said that it would not be possible for a young man to put in the number of hours required by the resolution unless he had longer than three months. But that was not the question. The real question was, could a young man learn his chemistry in the time now prescribed? If not, let him spend six months at it if necessary. He had found from the examination papers that the young men from Belfast were well up in chemistry. That could not be said with respect to young men from other parts of the country. In two years eleven men came up from Belfast, and every one of them passed in chemistry, while only about half of the men with Dublin addresses passed in that subject during the same time.

Professor Tichborne said Mr. Brunker had stated that under the present regulation it was possible for a young man to obtain a certificate after twenty-seven hours' work. If so, it was desirable to define a different time

but it was a serious thing to spring from a minimum of twenty-seven hours to a hundred hours. A very undesirable result of such a change would be to impose greater expense and difficulty on students, and oblige them to spend a longer time in the large towns, where they would have to study, and make them gravitate more towards Dublin than they should. The object of the Society's Act of Parliament, as appeared by its preamble, was to increase the number of persons qualified to compound prescriptions throughout the country, though not to undertake the functions of the apothecary. There were at present 300 licentiates on the Register of the Society. Of these 98 were in Dublin, 38 in Belfast, and 11 in Cork. Deducting all these from the 300 there remained 153. A great many qualified men became assistants, or took other appointments. Taking the second page of the Register at random he found that of the 39 names in it only 14 kept open shops of their own; and on the whole he found that leaving out the men settled in Dublin, Belfast and Cork there remained only 60 men for the 1920 post towns in Ireland, which gave the proportion of one qualified man to every 32 post towns. Therefore it was not desirable that they should increase the time to be spent at chemistry too much. He believed that at present Dublin was overdone. Again, the examinations were not paying. At the last examinations the Preliminary produced about £12, and that for the licence about £15. That would not pay their working expenses.

The President: It would be objectionable to allow any pecuniary considerations to weigh with us.

Professor Tichborne: I only allude to the matter incidentally.

Dr. Collins was in favour of some number of hours intermediate between one hundred and the present requirement.

Mr. Simpson said he agreed to a great extent with Professor Tichborne. If a young man attended a course of twelve weeks for three nights each week at two hours a night, that would be seventy-two hours; and if he could not in that time learn as much chemistry as the Society required, his previous education would have been very defective. He (Mr. Simpson) thought seventy hours would be long enough.

Mr. Hodgson said he considered chemistry one of the most important branches of examination, and there was no doubt that students ought to be well grounded in it. But, on the other hand, if the Council had hitherto been satisfied with a minimum of twenty-seven hours for chemical studies; and to spring from that to one hundred would be a very large increase, of which he very much questioned the prudence. But that any candidate could pass a satisfactory examination after twenty-seven hours' work was simply impossible. He would suggest seventy or seventy-five hours.

Mr. Wells said he knew of a man getting a certificate on twenty-four hours' work.

Mr. Simpson: He might have studied chemistry before he attended that course. We should not deter young men from coming to our business. We shall find it difficult to get them if we make the time too long.

Mr. Wells: I think the men coming to it are quite enough. We are overrun with chemists.

Professor Tichborne: Perhaps so in Dublin.

Mr. Wells: You would not get a man to go to a country town where he cannot get a living. How many of the post towns alluded to would support a chemist?

Mr. Brunker said the pith of the matter had not been touched in the discussion, except within the last few minutes by Mr. Simpson. When he brought this motion forward at the last meeting he said that he was not committed to one hundred hours. He was now, because he had not since heard a single good argument against that number. All the arguments that they had heard were based on the convenience of candidates or the convenience of teachers, the latter having been regarded as the most important. At the time he voted for the existing regulation he was under the impression that the student would work at practical chemistry on at least five days in the week. Now it appeared that he only worked on three days. He (Mr. Brunker) would not confine the course to three months. If the student could not put in his hundred hours in three months let him take five or six to do it. When the one hundred hours were decided upon the schools would arrange their days and hours accordingly. He had felt bound to bring this resolution forward in consequence of what the Visitor of the Privy Council had reported as to the cramming of candidates. The Council could not control men when once they were licensed; but he believed that a great many young men were acting foolishly in settling down in towns instead of seizing upon good openings in the country. The facts mentioned as to the pecuniary results of the examinations were really in his favour, because in consequence of young men not being able to pass at once they were examined twice over for the same fee. If they knew their business they would pass at the least expense to themselves and the Society. A change to one hundred hours would not be so great a jump as was represented, because the certificate on twenty-seven hours' work was only an extreme case, and he believed that the majority of young men under the present regulation put in from fifty to sixty hours.

Mr. Ray: Will this Society be the only one to fix one hundred hours?

Mr. Brunker: The English Society are trying heaven and earth to get powers to do what we have been doing for some years. Their requirements will be greater than ours, because their students will have to put in courses of materia medica and botany.

Mr. Wells: All the licensing bodies are moving in the same direction.

Mr. Simpson said it should be recollected that a considerable time was spent by the student, not at the bench, but in receiving theoretical instruction.

Mr. Wells: A young man is supposed to learn theory before he goes to the bench.

Mr. Simpson: I have never seen a case of it yet.

Mr. Wells said he himself was first taught elementary chemistry in the school in which he worked.

The President: They have it in nearly every school now.

Mr. Simpson: I would like to see the young man that will spend one hundred hours at the chemical bench before his examination.

Mr. Wells: If you come to my place I will show you a young man who spent three years at it.

Mr. Brunker: Some candidates come up with certificates of one hundred and forty and one hundred and sixty hours' attendance at practical chemistry.

Professor Tichborne moved an amendment that the time to be spent at the chemical bench be fixed at seventy-five hours. It would be enough, having regard to all the other subjects that the student had to learn.

Mr. Simpson seconded the amendment.

On a show of hands there were five for and five against the amendment.

The President gave a casting vote against it.

The original motion of Mr. Brunker was then put and carried.

Mr. Brunker moved that all certificates issued after July 1, 1887, shall be subject to the amended regulation.

Dr. Evans seconded the motion, which was unanimously agreed to.

Letters were read from the Secretaries of the Smithsonian Institution, Washington, and the Pharmaceutical Society of Great Britain, acknowledging the receipt of copies of the Society's Calendar for 1887.

A letter was read from Mr. Alfred Bride, L.P.S.I., asking for a duplicate licence in place of the one issued to him after he had passed his examination, which he said had been accidentally burned. He mentioned that the licence was absolutely necessary to him, as he was going to Australia.

The President: We cannot issue a second licence, but the Registrar can give him a letter stating that he is a licentiate, and that his licence was lost.

Dr. Evans: And stamped with the stamp of the Society?

The President: That can be done.

On the motion of Dr. Evans, seconded by Mr. Hodgson, it was ordered that a stamped letter be issued to Mr. Bride on payment of a fee of 10*s.* 6*d.*

A letter from Mr. Charles Ottagan explaining irregularities in connection with his applications for leave to present himself at the Preliminary examinations of April, 1885, and April, 1887, was pronounced satisfactory and ordered to be marked "read."

A letter was received from Messrs Wills and Wootton, of the Westminster College of Chemistry and Pharmacy, asking that that college might be placed on the list of those recognized by the Society. A number of high testimonials were enclosed.

Mr. Brunker: The only reply that can be given to that letter is that we shall not be in a position to increase our lists of recognized schools until the amended regulation as to the study of practical chemistry which has been passed to-day has been approved of by the Privy Council.

On the motion of the President, seconded by Mr. Grindley, Mr. Henry Boyers, of 1, Rathmines Terrace, County of Dublin, was elected a member.

Some financial business having been disposed of, the Council adjourned.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At a meeting of the Chemical Society on Thursday, May 5, Mr. William Crookes, F.R.S. (President), in the chair, a number of certificates were read for the first time, and the following papers were read:—

A *Contribution to the Study of Well Water.* By R. Warington, F.R.S.—The proportion of chlorine in the rain water at Rothamsted is 2 per million; the proportion of total combined nitrogen about 0·7 per million. Of 31 inches of rain, annually falling on a bare clay soil, 17 inches have evaporated and 14 inches percolated below 5 feet. Drainage chiefly occurs between October and February. The quantity of chlorine in the drainage from 5 feet of soil is the same as that in the rain, but the proportion is doubled in consequence of evaporation. The proportion of nitrogen as nitrates in the drainage water from 5 feet of bare clay soil has averaged 10·7 per million. The production of nitrates in the soil is chiefly during summer; the principal discharge of nitrates as drainage is in the autumn. When land is covered with vegetation evaporation is increased, and the winter drainage commences at a later period. Evaporation being increased, the chlorine in the drainage water may also be increased. The drainage from the Rothamsted unmanured wheat land contains 6 per million of chlorine; the drainage from the plot manured with farmyard manure, 7·3 per million. While vegetation is active no nitrates are found in the drainage water from the unmanured wheat; the nitrates reappear in autumn, after harvest. The average proportion of nitrogen as nitrates in the drainage from unmanured wheat is 3·4 per million; from wheat receiving farmyard manure, 5·8 per million. These are minimum numbers. With rain containing the amount of chlorine found at Rothamsted, the average proportion of chlorine in drainage water can hardly exceed 8 per million. The pure well waters of Harpenden contain a minimum of 4·4 of nitric nitrogen per million; this, therefore, is the average amount in the drainage water of the district. The deep wells in the chalk of Harpenden derive their main supply from a flow of underground water proceeding from north-west to south-east. Each well has besides its own local drainage. The pure well waters contain about 11 per million of chlorine; this amount does not sensibly vary throughout the year. Wells contaminated by sewage are generally at their maximum purity in October. They may show a commencement of a rise in chlorides one or two months after active autumn drainage has commenced. All through the drainage season, the effect of one month's drainage is not manifested in the well water till the following month. The maximum of chlorides in the contaminated wells occurs after the end of the drainage season—usually in March. The nitrates and chlorides increase at a nearly equal rate during the early months of the drainage season. If active drainage continues for three months, a great increase in the proportion of nitrates will usually then take place, and this relative excess of nitrates is maintained for some months. The proportion of nitrates to chlorides varies considerably in different contaminated wells. The sewage for poorly fed population yields a high proportion of chlorides to nitrates. Stable sewage furnishes apparently a high proportion of nitrates to chlorides. The old sewage contamination of deep wells is generally more or less chloric, chlorides being more permanent than nitrates. The well waters of Harpenden contain the nitrifying organism in small proportion; it is probably derived from surface soil which has fallen in. In the contaminated waters the quantity of silica is not increased, and the quantity of carbonates but little increased. Lime is considerably increased, and magnesia still more. Nitrates, chlorides and sulphates are largely increased. On comparing the low proportion of chlorine found in the pure chalk waters of Harpenden, near the edge of the London basin, with the amount found in other chalk waters, and especially with the chalk waters beneath the London clay; and considering further the proportion of chlorides which can possibly be contributed by rain: it appears highly probable that a portion of the chlorides in chalk water, and probably in the water of other strata, is derived from a residue of sea-salt remaining in the rock. The proportion of nitrates found in the waters of uncontaminated wells and springs in the permeable strata of England is fairly constant; it indicates an average loss to the soil of about 7 lbs. of nitrogen per acre per annum.

Crystals in Basic Converter Slag. By J. E. Stead and C. H. Ridsdale.—The authors describe a variety of crystals found near the centre of blocks of basic-converter slag, weighing 40–50 cwts. each, which had cooled slowly. No. 1. Large, well-formed, flat square crystals of a faint yellowish colour, consisting essentially of the phosphate $4CaO{\cdot}P_2O_5$. No. 2. Blue crystals, apparently a double calcium silicate and phosphate, $CaO{\cdot}P_2O_5$,$CaO{\cdot}SiO_2$. Vanadium protoxide was present to the extent of 1·64 per cent. No. 3. Feathery or fern-like crystals; remarkable as containing under 4 per cent. of acid oxides and over 95 per cent. of basic oxides—chiefly of calcium, magnesium, iron (protoxide and peroxide) and manganese. No. 4. Hexagonal, needle-shaped, lemon-coloured crystals, which appear to consist of about 86 per cent. $4CaO{\cdot}P_2O_5$ with 10–11 per cent. of silicates of metallic oxides. Nos. 5 and 6. Two varieties of flat black needles, the one magnetic, the other not. No. 5 consists of about 10 per cent. $CaO{\cdot}Al_2O_3$, 45 per cent. $3CaO{\cdot}Fe_3O_4$ and 33·5 per cent. $3CaO{\cdot}Fe_2O_3$. No. 6 contained about 15 per cent. $CaO{\cdot}Al_2O_3$ and 73 per cent. $3CaO{\cdot}Fe_2O_3$.

Note on the Influence of Temperature on the Heat of Dissolution of Salts in Water. By William A. Tilden, D.Sc., F.R.S.—This was a criticism of a paper by Mr. Pickering, published in the April number of the Transactions, in which that gentleman formulated his conclusion on the subject in the proposition that "the heat of dissolution of a salt increases uniformly with the temperature up to a certain point, when the rate of increase is suddenly lowered, and this fresh rate continues uniform till lowered again at some higher temperature,"

etc. The object of Dr. Tilden's paper was to show that all the probabilities, in addition to Mr. Pickering's own results, indicate that the heat of dissolution of a salt in water is a continuous function of the temperature.

The Distribution of Lead in the Brains of two Factory Operatives Dying Suddenly. By A. Wynter Blyth.—At a certain lead factory in the east of London five cases of more or less sudden death at different dates have been attributed to the effects of lead. In two of the cases the author had an opportunity of making a toxicological investigation. In the one case 24·25 mgrms. of lead sulphate was separated from the liver and 5·4 mgrms. from one kidney; there was also lead in the brain. In the second case investigated, occurring about a year after the first, the brain was more exhaustively examined, the cerebrum and cerebellum being treated separately and divided up by suitable means into white matter, kephalin, ether extract, substances soluble in cold alcohol and albuminoid residue, and the lead determined in each.

	Cerebrum, 460·8 grams.	Cerebellum, 156·2 grams.
Aqueous extract . . .	1·1 mgrms	0·4 $PbSO_4$.
White matter (kephalin-free)	—	5·0 „
Kephalin	1·5 „	6·0 „
Ether extract (from which kephthalin had been precipitated) .	—	—
Substances soluble in cold alcohol. . . .	—	—
Albuminoid residue .	40 0 „	6·0 „
	42·6	17·4

Calculated on the whole cerebrum this would amount to 99·7 mgrms., or a possible total for the whole brain of 117·1 mgrms. $PbSO_4$. There has hitherto been no reasonable hypothesis to explain the profound nervous effects of the assimilation of minute quantities of lead; but if it is allowed that lead forms definite compounds with essential portions of the nervous system, it may then be assumed that in effect it withdraws such portions from the body; in other words, the symptoms are produced, not by poisoning in the ordinary sense of the term, but rather by destruction—a destruction it may be of important nerve centres.

Researches on Silicon Compounds and their Derivatives. II. A New Chlorobromide of Silicon. By J. Emerson Reynolds, M.D., F.R.S.—In purifying a large quantity of silicon tetrabromide prepared by means of crude bromine, the author has separated a portion boiling at 140–141°, of the relative density 2·432, which analysis shows to be the chlorobromide of the formula $SiO(SiBr_3Cl)BrCl$.

ROYAL INSTITUTION.

Recent Additions to our Knowledge of Sponges.

As the last of a course of lectures upon "Recent Scientific Researches in Australasia," Dr. R. von Ledenfeld delivered a lecture at the Royal Institution on Saturday, the 7th inst., upon "Recent Additions to our Knowledge of Sponges." The lecturer did not confine himself to the sponges of Australia alone, but gave a *résumé* of the results of recent investigations on sponges, together with several new interesting details observed more especially in studying the growth of Australian sponges. With a passing reference to some peculiarities of the lower marine animals of the Australian coast, Dr. Ledenfeld remarked upon the preponderance of sponges over other forms of marine life in that part of the world. It has long been a point of discussion as to whether sponges belong to the Vegetable or Animal Kingdom, but naturalists are now generally agreed in regarding them as animals, a conclusion, the lecturer remarked, that Aristotle had also arrived at. Sponges grow in a variety of more or less irregular shapes, but it has been observed that the most regular structures occur in the calcareous species. As to colour, Dr. Ledenfeld remarked that some of the Australian sponges are of exceptionally brilliant hues, whilst others range from the black of the common sponge (*Euspongia officinalis*) to a pure white. Also it may be remarked, the sponges growing in deep water are of less decided colour and more elastic in character than those living in shallow water, and from the last-named quality are more valuable in commerce. The irregular honeycombed appearance of the sponge is due to a most complicated canal system, consisting of a series of chambers through which the water is drawn by the animal in always the same direction. The inhalent pores are very minute, and open into small subdermal cavities which communicate by means of interradial tubes with the ciliated chambers, the latter being very small ramifications of the interradial channels and in them the movement causing the current of water is maintained. From hence all fæcal and other matter is discharged through the oscula, the larger openings observed on the surface of the sponge. Dr. Ledenfeld showed the different parts of sponges by means of microscopic slides thrown on to a screen, and also the shape and arrangement of the chambers in different species. The ciliated chambers especially attracted attention. They are very small and circular, and the interior is clothed with cells very similar to the cilia cells in higher animal life. These cells are arranged around the ciliated chambers in the form of a collar, and from each cell flagella protrude which are in continual motion. These flagella, like bats' wings, are capable of being bent in only one direction, so that, in the course of their pendulum-like motion, in the movement one way the flagella are bent, whilst in the return movement they remain stiff, thus causing a current of water always flowing in one and the same direction. These ciliated chambers are easily detected in the sponge by means of a microscope, as they appear more highly coloured. After the lecturer had thus given a general outline of the structure of the sponge, he drew attention to the character of its food and its method of digestion. It is not known exactly what the sponge lives upon, but if upon other animals they must be necessarily very small, owing to the size of its inhalent pores. The sponge, like the tape-worm, has no stomach, but must absorb its food through the outer skin from matter in a soluble state, similarly to the roots of trees. This process of absorption is probably accomplished in the interradial or ciliated chambers, more probably in the former, as the latter are generally considered excretory in function. Lime or silica must also be absorbed from the water by most sponges in order to make up the skeleton. The skeleton of calcareous sponges consists of a number of spicules composed of carbonate of lime. These spicules are of very varied though regular shape, but ordinarily assume a rod-like needle shape or else a stellate form. In silicious sponges the spicules are composed of silica, and are generally deposited around axial rods in concentric layers. The spicules are joined together and cemented by a body that has been named "spongin," which has much the same chemical composition as silk, and, like silk, is very elastic. In some varieties of sponges, especially in the kinds which come into the market, the skeleton is almost entirely composed of fibres of pure "spongin." These fibres are so close together as to draw up water by capillary action, and indeed a great deal in the value of a sponge depends upon the fineness and tenuity of these fibres. Dr. Ledenfeld again illustrated this stage of his lecture by means of a number of microscopic slides in which the variety of shape and size of these spicules and "spongin" fibres were shown. The spicules are some crutch-like, others spined or echinated, whilst the deep-sea sponges appear to grow long thick spicules which attach the sponge to the ground by means of grapnel-like ends. In some cases the skeleton seems to be more or less replaced by sand, the small grains of which are cemented together by the "spongin." Dr. Ledenfeld

then drew attention to the presence of more highly developed organs in the sponge. Muscles pervade the whole tissue of the sponge, but are found more particularly in the superficial parts. One set of muscles affect the size of the inhalent pores, causing them to contract or expand, whilst another set are able to close the pores altogether, thus acting as a protection from the attack of an enemy. All these muscles are composed of spindle-shaped cells, which are capable of spasmodic motion, but recently in an Australian sponge, the *Euspongia canalicula*, the lecturer said he had observed muscles approaching very nearly in character those of the human frame. That sponges have nerves, is a discovery of recent date by a member of the Royal Microscopical Society. Dr. Ledenfeld also about the same time found indications of the presence of a nervous system, but the form in which he observed the nerves at first apparently differed from those observed simultaneously. This difference, however, he afterwards found to be due to the manner in which the section had been prepared for observation. The nerves consist of two cells at the base of a cone-like projection on the epidermis, and from each cell a fibre runs to the point of the cone, besides several others connecting them with the interior of the sponge. It is remarkable that here again Aristotle has predicted that sponges have a nervous system, basing his statement on the fact that ancient Greek mariners foretold storms by the alleged contraction of the sponge. The reproductive organs of sponges are also very highly developed and both ova and spermatozoa are found throughout the sponge, though more concentrated in the interior. The ova consist of spherical cells, whilst the spermatozoa resemble an arrow-head in shape. It has not yet been ascertained whether two sexes exist in sponges, or whether the ova and spermatozoa are produced at different periods by the same sponge. When the embryo has become partly developed it detaches itself from the parent sponge, and, issuing from the oscula, propels itself through the water by means of a number of flagella. Silicious spicules next appear in its structure, and it then attaches itself to a rock and assumes its mature form. Sponges are most numerous in the waters of the temperate and sub-tropical zones, and the salt-water varieties are by far more numerous than the fresh water. Thus whilst there are not more than ten fresh-water species known, Dr. Ledenfeld remarked that about one thousand species of salt-water sponges had been recognized. Each species of the salt-water sponge is, however, generally found only in limited areas, and very few, all of which inhabit deep water are cosmopolitan. This is the more remarkable as Dr. Ledenfeld asserts that all the sponges inhabiting the rivers of Australia are identical with the fresh-water sponges of Europe, and in order to explain this fact he put forward a rather interesting theory. He assumes that sponge life in rivers has been originally generated by the introduction of a single, or at most two or three, germs by means of aquatic birds. The inbreeding consequent upon this paucity of sponge life has produced a certain fixity of character in fresh-water sponges, and is in direct opposition to the effects of hybridization in the salt-water sponges, by which they have acquired the capacity of adapting themselves to local circumstances.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, May 5, Mr. E. J. Woolley in the chair.

Miss Buchanan read the following paper:—

The Quantitative Application of the Reaction between Nitrates and Ammonium Salts.

BY MARGARET E. BUCHANAN.

A method for estimating nitrates, which would be quick and easy to perform, and would at the same time give practically accurate results, was thought to be a desirable object, more especially in connection with the analysis of ordinary inorganic salts, and the estimation of medicinal chemicals.

It was suggested that the decomposition of NH_4NO_3 by heat into N_2O and H_2O might be made use of quantitatively, so the following few experiments were made with a view of seeing if this reaction could be relied upon when nitrates of other metals were heated with ammonium salts.

A weighed quantity of KNO_3 was first taken, mixed with an excess of AmCl, and heated in a bent tube over mercury to about the boiling point of Hg (300°–400° C.), till the first strong effervescence ceased, the whole allowed to cool, and the temperature and length of column of mercury taken. A mark was then affixed at the level of the mercury, the tube emptied, and water from a burette run in up to the mark. The volume of the gas (N_2O) thus obtained when corrected gives by calculation the weight of KNO_3 taken. Free NH_3 was discovered in the first two or three experiments, so a little dilute H_2SO_4 was passed into the tube to absorb it. Ultimately the use of AmCl was abandoned, as free chlorine given off in one instance spoiled the result (probably $N_2O + 2HCl = N_2 + H_2O + Cl_2$). Ammonium sulphate was then used, and a few good results also obtained, *e.g.*—

		Heated with	Gave by calculation
KNO_3 taken	·0549 grm.	Am_2SO_4	·05501 grm.
KNO_3 „	·086 „	„	·0754 „
KNO_3 „	·046 „	AmCl	·0485 „
KNO_3 „	·0405 „	„	·0412 „

Finally Am_2SO_4 was abandoned also in consequence of a statement in Watts's 'Dictionary of Chemistry,' to the effect that Am_2SO_4 heated above 280° C. decomposes into NH_3, N, H_2O and NH_4HSO_3, probably according to the equation—

$$3(NH_4)_2SO_4 = 3NH_4HSO_3 + NH_3 + N_2 + 3H_2O.$$

However, I may say in passing that on heating Am_2SO_4 in a tube over mercury to about the same temperature as was used in the experiment with the nitrates, much higher than that mentioned, a good deal of gas was given off, readily absorbed by a little dilute acid; and on repeating the experiment and decanting the gas it was found to be all dissolved by water, indicating that all the gas given off was NH_3. The residual salt gave no traces of sulphite by the nascent hydrogen test. I then heated Am_2SO_4 in an open dish till acid vapours came off freely, and still no sulphite could be found in the remaining salt, the only decomposition being apparently into NH_3 and NH_4HSO_4. But although I have not found confirmation of Watts's statement, still it was thought better to use ammonium phosphate in all the later work done, as the NH_3 given off readily recombines on the withdrawal of heat, and there cannot be any secondary decomposition.

The simple bent tube was found inconvenient, from the liability to lose salt from particles running down with the descending column of mercury, so a modification was suggested, which was found to answer admirably. An ordinary burette was taken, connected by a foot or so of strong india-rubber tubing to a large funnel (or a large pipette is more convenient), and the whole, having been fixed in a couple of burette-stands, was filled with mercury up to within two or three inches of the top of the burette, avoiding the use of more mercury than was necessary to do this. A few c.c. (three or four) of strong acetic acid was then poured on the mercury in the burette, to absorb any NH_3 which might be given off. The apparatus being now ready for use, a weighed quantity of the nitrate is taken, mixed with $(NH_4)_2HPO_4$, and introduced into a piece of combustion-tubing, five or six inches long, and closed at one end. This is then connected by means of a cork and bent tube to the top of the burette; water is poured on the mercury in the funnel to form a column balancing the acetic acid in the burette, and the funnel is gently moved up and down until the surfaces of the mercury in both parts coincide,

and this level is then read off and noted. It will be seen that the pressure inside is the same as that of the atmosphere, the height of the barometer should therefore be taken, and the temperature. After seeing that all points are perfectly secure, the small tube is heated, gently at first, afterwards more strongly, till all effervescence ceases, the whole then cooled to its original temperature, the funnel again moved up and down till the levels of the mercury coincide, the increase in volume read off, and from this volume of N_2O the amount of nitrate calculated.

A 50 c.c. burette is convenient for quantities of salt from ·01 to ·1 gram. It will be seen that the results with this form of apparatus come out almost uniformly well, the decomposition taking place equally well when nitrates of alkaline earths and metals, such as barium, mercury, lead and aluminium, are fused with Am_2HPO_4, but care has to be taken to thoroughly fuse these, for they require more heat than nitrates of the alkali-metals. Barium nitrate takes as long as ten minutes to decompose entirely.

A few experiments were then made to see if the presence of a third salt affected the result, and it was found that sulphates of potassium and other metals did not interfere; and nitrites also, if the percentage is known, give no trouble, for the amount of nitrogen given off by them ($NH_4NO_2 = N_2 + 2H_2O$) can be deducted from the total volume of the gas. It should be noticed here that the total volume of the gas must be reduced to normal temperature and pressure before this deduction is made.

The apparatus may in fact be used for the estimation of nitrites alone.

It was found that the presence of chlorides of the fixed alkalies introduces considerable error into the result, chlorine being liberated.

Oxalates also cause the volume of the gas to be too great, probably because some CO is oxidized by N_2O, and thus a result cannot be obtained by subtracting the volume of CO (theoretically obtainable) from the total volume of gas, for it seems that the gas evolved bears no constant ratio to the amount of salt employed. Possibly the reactions as expressed by the following equations may take place :—

(1.) $K_2C_2O_4 + 2(NH_4)_2HPO_4 + 2KNO_3 = 2K_2HPO_4 + (NH_4)_2C_2O_4 + 2NH_4NO_3$.

(2.) $(NH_4)_2C_2O_4 + 4NH_4NO_3 = 5N_2 + 2CO_2 + 12H_2O$.

The results of these few experiments in the "burette apparatus" are tabulated below.

Salt used.	Quantity.	Ammonium Salt used.	Amount of salt calculated from volume of gas.
	Grm.		Grm.
KNO_3	·0551	AmCl	·0725 } all contaminated
$Ba(NO_3)_2$	·1063	AmCl	·1152 } with
KNO_3	·0569	$Am_2HPO_4 + NaCl$	·0739 } chlorine
KNO_3	·0519	Am_2SO_4	·062
KNO_3	·056	Am_2SO_4	·0586
KNO_3	·05	$Am_2HPO_4 + Na_2SO_4$	·0523
KNO_3	·0851	$Am_2HPO_4 + Na_2SO_4$	·0884
KNO_3	·0855	Am_2HPO_4	·093
KNO_3	·0614	Am_2HPO_4	·056
KNO_3	·0775	Am_2HPO_4	·0769
KNO_3	·0559	Am_2HPO_4	·0555
KNO_3	·0719	Am_2HPO_4	·0727
$NaNO_2$	·0549	Am_2HPO_4	·056
KNO_3 ·06, $NaNO_2$ ·0324		Am_2HPO_4	·0543 calculated as 100 per cent.
$Ba(NO_3)_2$	·105	Am_2HPO_4	·113
$Ba(NO_3)_2$	·1841	Am_2HPO_4	·1823
$Pb(NO_3)_2$	·171	Am_2HPO_4	·1712
$HgNO_3$	·384	Am_2HPO_4	·3832
$Al_2(NO_3)_6$	·103	Am_2HPO_4	·1093

The paper gave rise to a discussion, in which the Chairman, Secretary, Miss Munro, Messrs. Millard, Eastes and Bird took part.

The next paper was a Report on Botany, dealing with the subject of the—

Structure of the Flower of the Petaloid Monocotyledons.

BY E. G. BAKER.

The object of the paper was to trace out the relationship of some of the aberrant and irregular types to the regular typical central forms. The author pointed out that in the petaloid monocotyledons, the central type from which the others radiate is represented by the polyphyllous Liliaceæ, examples of which are the well-known genera, Allium, Scilla and Lilium. In these there are six segments of the perianth free, six stamens opposite the perianth segments, and either hypogynous or slightly attached to the base of the perianth segments, and a superior ovary with three carpels with axile placentation. Perhaps the first stage of deviation to be noticed is in the gamophyllous Liliaceæ, the segments of the perianth being united instead of free and the stamens epiphyllous. The transition can be traced by most gradual stages. For instance compare Scilla, Chionodoxa, Hyacinthus and Muscari. Amaryllidaceæ differs from Liliaceæ in that the ovary is united to the perianth (*i.e.* is inferior), but the difference between a superior and an inferior ovary is often included within a single natural order (examples, Rosaceæ, Bromeliaceæ and Saxifragaceæ), and the transition is often very gradual.

As intermediate forms between Liliaceæ and Amaryllidaceæ may be mentioned Tecophilæa, Conanthera and Coningia, in which the bottom of the ovary adheres to the perianth and the top is quite free. In Iridaceæ we have essentially the Amaryllidaceous structure, but three of the stamens are suppressed. In Pauridia, an Amaryllidaceous genus, there are only three stamens. Iridaceæ comprises quite a variation of forms. These are the regular flowers, such as ixia and crocus; then the flowers in which the outer row of the perianth is different from the inner (ex., iris); then the irregular flowers, such as gladiolus. But the most complex natural order among the Petaloideæ is Orchidaceæ, comprising almost every variation in form conceivable. The perianth consists of six segments, rarely the segments are nearly uniform (ex., Thelymetra), generally one of the six is much differentiated and is called the labellum.

To understand the labellum it is necessary to go back a stage. Occasionally irregularity occurs in Amaryllidaceæ (ex., Amaryllis); when this does occur, the segment of the perianth that is irregular is always the one corresponding to the labellum in Orchidaceæ. The labellum is differentiated to the greatest extent in Cypripedium; this, however, is arrived at from the nearly regular forms by progressive stages.

The majority of the Orchidaceæ have one stamen, Cypripedium has two, and Thelasis three stamens, and occasionally in cases of abnormal growth in this order more occur; we are therefore justified in referring this to the normal monocotyledonous type in which five and sometimes four stamens are suppressed. The ovary in Orchidaceæ is usually one-celled with three parietal placentas. Selenipedium, a genus of Orchidaceæ closely resembling Cypripedium, has, however, a three-celled ovary, and this is a connecting link between Orchidaceæ and Iridaceæ. The genus Neuwiedia also affords an interesting connecting link. The segments of the perianth are similar, the ovary three-celled and the stamens three, and thus only differs very slightly from Iridaceæ, although it is included by Hooker and Bentham in Orchidaceæ. But the above is sufficient to show that there is not, as is often supposed, an abrupt line of demarcation between one natural order and another, but that it is often extremely difficult to define the exact limits of a natural order, and that a natural order

must be looked upon as a group containing a certain variation in structure and not as a type from which there can be no deviation.

A discussion followed, in which the Chairman, Secretary, Messrs. White and Millard joined.

The Secretary announced that the Executive Committee had made a grant of 11*s.* 6*d.* from the Research Fund to Mr. A. Smith to meet the expenses of his work on the officinal succi, and a grant of £1 to Mr. R. A. Cripps for a proposed research on coniine.

The meeting then adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The annual general meeting was held on May 4, Mr. H. H. Millhouse, President, in the chair.

The minutes of the previous meeting having been read and confirmed, the Chairman called upon the Secretary to read—

The Annual Report.

The Council, in presenting the annual report for the tenth session, have a very pleasing duty to perform.

The Association numbers 165 members, 72 of whom having been enrolled during the present session, showing a numerical increase of 34. There are 34 patrons, being an increase of 7. The average attendance at the meetings has been exceptionally good, viz., 38, this being much larger than during any previous period. The papers read were of considerable merit, and many of them of special value. Special attention has been devoted to the musical and social evenings, and they have proved very attractive. The conversazione was held at the Portman Rooms on November 24, 1886. It was most successfully conducted on an extensive scale, and in order to meet the largely increased expenditure a charge was made for extra tickets. The annual dinner, held at the Holborn Restaurant on March 11, 1887, was presided over by the President of the Pharmaceutical Society, and supported by many eminent medical men and pharmacists; members and friends attended in great numbers, and evidently much appreciated the programme provided for their entertainment.

The Council have this year granted £20, or an increase of £5, towards the publication of the 'Proceedings' of the Association.

The sole disappointment of the session has been the apathy shown by members in not competing for the Burroughs Wellcome prize; three essays only were received, and after careful consideration the Committee decided that none were of that standard which would justify them in recommending the Council to make the award.

The accompanying balance sheet shows that financially the Association is in a most satisfactory condition.

The unexampled success of the session, and the rapid progress the Association has made, render the submittal of the report an agreeable duty. The Council has to thank members and friends who have so ably and willingly assisted them, and to ask a continuance of their valuable support on behalf of their successors.

The President moved and the Vice-President (Mr. T. S. Dymond) seconded the adoption of the report, which after some discussion was carried unanimously.

The Treasurer (Mr. W. R. Dodd, F.C.S.) then read the balance sheet, of which the following is an abstract:—

Receipts.	£	*s.*	*d.*
Balance, April 30, 1886	24	1	0½
Grant from Publishing Fund	15	0	0
165 members' subscriptions	41	5	0
34 patrons' subscriptions	18	18	0
Balance from Dinner Fund	7	6	2
Publishing of papers	1	3	6
Donations	27	1	6
Rent of piano	5	0	0
Sale of 'Proceedings'	6	13	3
Advertisements in 'Proceedings'	4	16	0
	151	4	5½

Expenditure.	£	*s.*	*d.*
Rent	25	0	0
'Proceedings'	31	7	4
Stationery and printing	10	11	8
Stamps	3	11	2½
Post wrappers	3	2	9½
Post cards and printing	6	10	6
Hire of piano	1	11	0
Refreshments	5	7	0
Conversazione	11	8	6
Lime-light for lecture	1	10	0
Sundries	0	2	2
Grant from Publishing Fund	20	0	0
Balance in hand	31	2	3½
	151	4	5½

The President, in moving its adoption, pointed out that in consequence of the larger number of members and patrons, the Council had been able to grant an additional £5 to the publishing fund, and to carry over a balance of £31 2*s.* 3½*d.*, being an increase of £7 1*s.* 3*d.* over that of the previous session.

The motion was seconded by Mr. W. G. Blackham, and after a lengthy and critical discussion carried unanimously.

The followlng resolution was moved from the chair:—"That the following words be added to rule 6:—'Members shall not be entitled to tickets unless their subscriptions be paid.'"

It was seconded by the Vice-President, and carried.

The scrutineers, Messrs. J. B. Barnes, jun., and J. H. Huckidge, reported that seventy-nine voting papers had been received, three of which were informal, the result of the election being that all the old members of Council standing for re-election, together with two new members, Messrs. Millard and Vallance, were elected. The following will, therefore, constitute the Council for the ensuing session:—H. H. Millhouse, T. S. Dymond, J. E. Saul, W. B. Botham, F. C. J. Bird, C. J. Strother, E. S. Taylor, W. R. Dodd, F.C.S., A. J. Phillips, T. A. Ellwood, A. G. Worsley, E. H. Farr, E. J. Millard, A. C. Vallance.

After a vote of thanks had been passed to the scrutineers, the President delivered a short valedictory address. He thanked the Council and members for the valuable assistance they had rendered him, and said, if they were careful how they used in the future the power they now undoubtedly possessed, still greater successes were in store for them.

A vote of thanks to the President for his services during the session was proposed by Mr. W. G. Blackham, seconded by Mr. Taylor, and carried with acclamation.

The proceedings then terminated.

ANSWERS TO CORRESPONDENTS.

Gratton.—There is no doubt that the Act of Parliament restricts the use of the title of "chemist and druggist" to registered persons. But in such a case as you refer to the title would appear to be applied to the consignee by some other person, for which he could hardly be made responsible.

J. B.—See some recipes for paste for labels, before, p. 469.

H. Shillinglaw.—Your letter has been handed to the Honorary Secretary to the Fund, the list having been published as supplied officially.

J. M. Furness.—The subject referred to in your letter has not been overlooked; but though the Council is in favour of carrying out the change you speak of, it is considered that there has not yet been a favourable opportunity for doing so.

Inquirer.—The Regulations relative to the appointment of dispensers in Her Majesty's naval hospitals will be found in the Society's Calendar. The appointments are open to men possessing the Minor qualification, but only Major men receive the extra allowance for the charge of stores.

Communications, Letters, etc., have been received from Messrs. Segg and Co., Oldberg, Elborne, Gratton, Hopkins, T. G., A Member.

REPORT

ON

JENSEN'S ICE-REFINED COD LIVER OIL

By Professor E. SALKOWSKI, M.D., of Berlin University.

In accordance with your wish, I have subjected Jensen's Non-Congealing Cod Liver Oil to a very searching examination, and have also compared the same with other kinds of cod liver oil of good repute.

According to the result of this examination, a detailed report of which I enclose,* there can be no doubt that this Oil is pure and unadulterated; that it has been prepared from perfectly fresh materials, with all care, and that it is in every respect an irreproachable article.

The extraction of the heavy insoluble parts of the Oil, a principal aim in the manufacture of the present day, has been achieved in a manner more perfect than in the other oils which I have examined.

This Cod Liver Oil is even clear and fluid at from 10° to 14° of frost.

In consideration of this, of the almost complete absence of fatty acids soluble in water, and of the presence of an appropriate percentage of free fatty acids insoluble in water (corresponding to 4·05 per cent. of oleic acid), a guarantee is afforded of the exceeding great digestibility of the Oil. Its slight colour and its very mild taste will further help to procure to the Oil the foremost place amongst all cod liver oils which have been brought into the market.

(*Signed*) E. SALKOWSKI, M.D,
Professor of the University.
President of the Chemical Laboratory of the Pathological Institute in the Royal Hospital of Berlin.

ICEBERG BRAND, in Bottles, 1s., 2s., 3s. 6d., and 6s. 6d.

JENSEN'S COD LIVER OIL.

Bulk Oil in Barrels and Winchesters.

Made at the Company's own Factory in BRETTESNŒS, LOFODEN ISLANDS NORWAY, the largest and the best equipped Factory in the World. Bulk deliveries can be made in Bergen, Hamburg, or London.

HERTZ & COLLINGWOOD, 101, LEADENHALL STREET, LONDON, E.C.

Sole Agents and Bottlers for Jensen's Cod Liver Oil (Iceberg Brand).

* *A copy of this Detailed Analysis, with a sample of the Oil, forwarded free on application to the Agents in London.*

Chemists' Tea Agency.

WALKER & DALRYMPLE'S
BROKEN-LEAF TEA, 1s. 8d. per lb.
A MONEY SAVING TEA. ABSOLUTELY PURE.
The small leaf from some of the finest India and China Teas. Produces a tea in the cup stronger, richer, and cheaper than most whole-leaf teas. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S
INTERMEDIATE TEA, 2s. per lb.
BEST at the PRICE EVER SOLD. Great strength, and a most useful tea where there is a large consumption. Recommended to all who wish to SAVE in their tea. Agents appointed, where unrepresented, throughout the United Kingdom.

WALKER & DALRYMPLE'S TEAS.—AGENTS APPOINTED, where unrepresented, throughout the United Kingdom.
Prospectus and samples free on application.
Warehouses, 154, 155, 159 and 160, Whitechapel Road, and 2, 4, 6, 8, 10, 11 and 12, Brady Street, London.
P.O.O. payable at head office. Bankers, the National Provincial Bank of England.

"laden with the scent of flowers,
And breath of odorous Spring."

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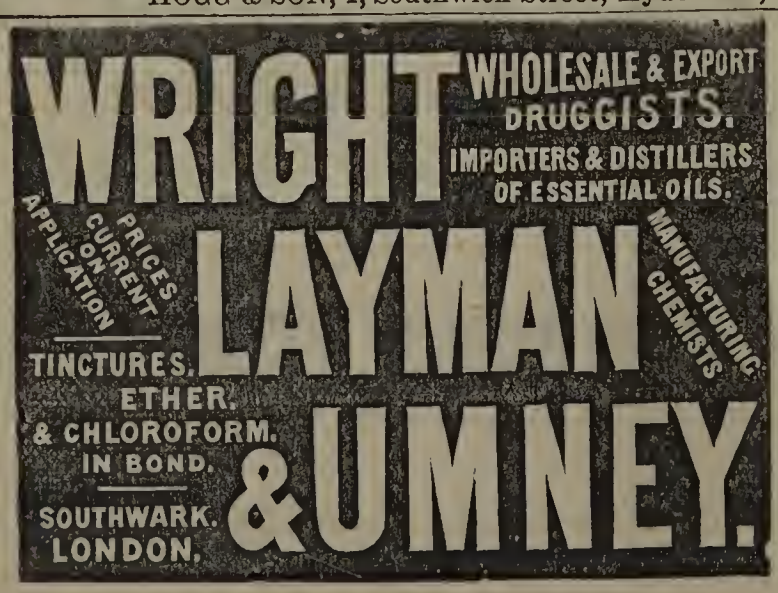
A Company of Merchants are now selling through SPINNER & CO. the choicest Teas that come from India and China at 2/8, 2/4, 2/-, and 1/8 a pound, in packets only. These are the perfection of Teas, and will please the most fastidious.—Agents wanted in every town and village. For Terms apply to SPINNER & Co., 60, Strand, London.

SPINNER & CO., London and Liverpool.

LITHIA, with Potash or Ammonia.
CITRATE OF POTASH WATER.
POTASH AND SODA, B.P.
MINERAL ACID WATER.
PURE LEMONADE AND GINGER ALE.
Sole Makers of Stevenson's Aërated Lime Water.
The above may be had in Bottles or Syphons.
Orders for 6 dozen carriage free.
HOGG & SON, 1, Southwick Street, Hyde Park, W.



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ONLY ORIGINAL POWDER DIP.
USED ON 50,000,000 SHEEP A YEAR.
Soluble in COLD Water.
THE CHEAPEST, SAFEST AND BEST
FOR TICKS, FLY, SCAB
And for all other Sheep Dipping purposes.
UNEQUALLED AS A DIP FOR LAMBS.
CAUTION ☞ As the result of the great and increasing sale of this Dip several injurious imitations have recently been placed upon the market. It cannot be expected that these will give the good results which always follow the use of Cooper's Sheep Dipping Powder, which has *Stood the Test of Half a Century.*

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For Preventing the Fly Striking Sheep and Lambs, Destroying the Maggot, &c.
In 1-lb. packets to retail at 6*d.*, and 2½-lb. perforated Canisters to retail at 1*s.* 4*d.*
Specially Low Quotations for Fly Powder in Bulk.
Samples on Application.

Counter Bills and Directions in English, Spanish, Dutch, &c., may be had on application.

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Chemical Works, BERKHAMSTED, ENGLAND.

PETROLEUM JELLY

EQUAL TO AND CHEAPER THAN VASELINE.
SANITARY FLUID AND SHEEP DIP,
THE CHEAPEST AND BEST DISINFECTANT.
Grease, Pitch, Asphalte, and all products of Tar and Rosin.
Samples and Prices on application.
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SELLERS'
PEPSIN PORCI PUR.

Admitted to be the best Pepsine in the market.
1 oz., 3/6; 4 oz., 12/-; 1 lb., 45/-, free by post. Supplied in bulk to the Wholesale Trade.

J. SELLERS, Manufacturing Chemist,
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"THE BEST NATURAL APERIENT."

Persistent attempts are made by interested parties to deceive the public by offering Natural Mineral Aperient Waters with marks, names, and designations very similar to those which are used by the **APOLLINARIS COMPANY, LIMITED,** for the **NATURAL MINERAL APERIENT WATERS** imported by them.

Under these circumstances the **APOLLINARIS COMPANY, LIMITED,** feel compelled to caution the public that the **HUNGARIAN BITTER WATER** sold by the **COMPANY** always bears the name of the **APOLLINARIS COMPANY, LIMITED,** on the Label.

Woodhall Spa.

BROMO IODINE MINERAL WATER.

The strongest known Mineral Water in the world. This remarkable Spa has been purchased by a syndicate of gentlemen, who have determined to make more widely known the extraordinary curative powers of this Spring, which contains more Iodine and Bromine than any Spring in Europe. An analysis of the water having been made in November, 1886, by Professor Wanklyn, M.R.C.S., corresponding member of the Royal Bavarian Academy of Sciences, Professor of Chemistry, a very important discovery has been made—viz., the presence of Free or Elementary Iodine.

Dr. WANKLYN says:—"So far as I am aware, this is the first instance in which free iodine has been found in appreciable quantity in a natural water. For many years the Woodhall Spa has been celebrated as a valuable remedy in skin diseases. The fact that it is a solution of free iodine is interesting in this connection, and well worthy of the attention of the medical profession."

The Woodhall Bromo Iodine Water is now being bottled at the Spring by the Sole Agents, BROMLEY & CO., Chemists, 233, High Street, Lincoln, 5 and 6, The Grove, Buxton, and Woodhall. All communications to be addressed to them at the Spa, Woodhall, Horncastle.

Since the introduction of Pepsine by BOUDAULT and Dr. L. CORVISART, BOUDAULT'S Preparations have been considered the most reliable.

BOUDAULT'S PEPSINE.

The Paris Hospitals have used no other.

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Medaille Unique. *Medaille d'Argent.* *Medaille d'Or.* *Medaille de Merit.*

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BOUDAULT'S PEPSINE—dose, 5 to 10 grains—in bottles, one ounce, 5/-; in bottles, half-an-ounce, 3/-
BOUDAULT'S PEPSINE WINE—dose, a tablespoonful—in bottles, 4/- and 3/-
BOUDAULT'S PEPSINE PILLS AND LOZENGES—dose, 2 to 4—in bottles, 3/3.

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CAN BE HAD OF ALL CHEMISTS.

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REGULAR importations of the finest Jamaica Bees-Wax. Can supply either large or small quantities, and at prices much below that charged by the usual trade. Send 2d. Stamps for Samples, Prices and Illustrated Trade Catalogue.

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ENAMELLED PATENT LETTERS, for Signboards, Showcards, Price Tickets. Most attractive advertising at less cost than printing or writing. To enable everybody to judge for himself, a Doorplate, with his name elegantly made up, will be forwarded for five stamps with further particulars. For estimates and particulars send stamped envelope. Gilt bevelled-edge Cards at factory prices.

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2/- per lb., C. Qts. 1/10, W. Qts. 1/9.

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The new remedy for Eczema and Ringworm. IMPORTED DIRECT FROM THE INTERIOR OF RUSSIA. See *Pharm. Journ.*, pp. 381, 439.

8/ per lb., C. Qts. 7/, W. Qts. 6/.

Also TINCT. RUSCI, COLLOD. RUSCI, and POMADE RUSCI "Hebra."

GLYCEROLE OF PEPSINE

A SPECIAL PREPARATION.

Perfectly reliable, and the most valuable fluid form for the administration of *Pepsin. Porci.* It is of definite strength and slightly acid; free from odour, and almost tasteless.

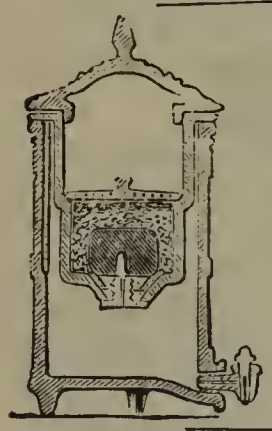
7/ per lb., C. Qts. 6/6, W. Qts. 6/

EACH OF THE ABOVE WILL KEEP GOOD IN ANY CLIMATE.

T. GREENISH, { 20, New Street, Dorset Square, and 5, Bathurst Street, Hyde Park, W.

DOULTON'S
MANGANOUS CARBON FILTERS

(NEW PATENT).



Can be entirely taken to pieces for cleaning.

Are easily renewed at very small cost.

Will purify very foul water and render it fit for consumption.

SEE REPORTS, ANALYSES, &c., OF ALL DEALERS.

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BENGER'S PREPARATIONS.

These Preparations received a FIRST-CLASS AWARD (the Highest Obtainable), at the INTERNATIONAL MEDICAL AND SANITARY EXHIBITION, SOUTH KENSINGTON.

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BENGER'S PEPTONISED BEEF JELLY—May be taken by teaspoonfuls as a quick restorative, or used to fortify ordinary beef-tea, soups, &c. Tins, 2s. each.

BENGER'S SELF-DIGESTIVE FOOD—For Infants and Invalids. When mixed with warm milk, digestion of the whole commences at once. Tins, 1s. 6d. and 2s. 6d.

Of all leading Wholesale and Retail houses.

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Absolutely Pure.

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THE ORIGINAL PREPARATION.

Invented and introduced to medicine by Mr. G. F. SCHACHT in 1855. Its distinct superiority is universally admitted. Dispensers are warned against imitations and substitutions, whose use endangers reputation.

Syr. Cinchonæ Alcoholic., Schacht.
Bark, minus the woody fibre. Dose ℥ss.

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An odourless and palatable fluid, guaranteed of invariable strength. One teaspoonful peptonises 1000 grs. of Albumen. Price 7s. per lb.

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Each drachm contains, concentrated, besides the liquid Pepsine, a full dose of Liq. Bismuthi, Schacht. Price 7s. per lb.

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A real aperient, mild and constant.

Infallible Essence of Rennet.
Entirely new, perfectly reliable, and does not cause vexatious failures, with consequent friction between buyer and seller. No SALT. No special taste, smell, or colour. Handsomely put up in large 1s. bottles.

The above Preparations are manufactured by Mr. Schacht himself in the laboratory of the firm.

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The Original Arnicated Corn and Bunion Plasters.

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SPECIALITIES.—Glycerine of all gravities, Sulphur, Brimstone, and Beeswax. Leghorn Oils, Olive and Castor, Essence of Lemon and Bergamotte, Oil of Lavender and Thyme. Chloral Hydrate and Croton Chloral Hydrate.

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SPECIALITIES:

Glycerine—Gum Arabic—Gum Tragacanth—Pure Beeswax—Honey—Vanilla.

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Best and Cheapest **TERROLINE** Petroleum Jelly.

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A SPECIFIC FOR SKIN DISEASE

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Preferred to all Makes hitherto used.

In Cases of Twelve Six Yard Rolls, 2 inches wide, 3s. 9d.; 2½ inch, 4s. 6d.; 3 inch, 5s. 6d.; or, case containing twelve six yard rolls of each width, 13s.

Free by post, to any address in the United Kingdom, for prepaid orders only. Manufactured by

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METHYLENE

Obtained by the action of Metallic Zinc on Chloroform and Alcohol.

Discovered to be a general Anæsthetic by Dr. RICHARDSON, in 1867.

1-lb. Bottles, 16s.; 8-oz., 8s. 6d.; 4-oz., 4s. 6d.; 2-oz., 2s. 6d.

COMPOUND ANÆSTHETIC ETHER,

For producing local Anæsthesia.

In 4-oz., 10-oz., and 20-oz. Stoppered Bottles, 2s., 4s., and 7s.

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In 2-oz., 4-oz., 8-oz., and 16-oz. Stoppered Bottles, 2s., 3s. 6d., 7s., and 12s.

PEROXIDE of HYDROGEN,

First introduced as a Medicine by Dr. RICHARDSON.

ETHYLATE of SODIUM

(Dr. RICHARDSON'S Formula), for removing Nævi, &c. In ½-oz. and 1-oz. Bottles, with elongated stoppers for applying the caustic, 2s. 6d. and 4s.

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For promoting the Healing of Wounds by the first intention.

In 2-oz. and 4-oz. Bottles, with Brush, 2s. 6d. and 4s. 6d.; 16-oz., 12s.

CHARCOAL CAPSULES,

Containing pure Vegetable Ivory Charcoal. In boxes, 2s. 6d. each.

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Laboratory and School Buildings:

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The following Students of this School were successful in passing their examinations last month.

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„ F. T. Palmer.	„ A. H. Walker.
„ W. J. I. Philp.	„ S. W. Woolley.

MINORS.

Mr. E. E. Allen.	Mr. W. H. Keen.
„ J. H. Cooper.	„ S. T. Milbank.
„ W. C. Ford.	„ H. C. Morris.
„ G. E. Gratton.	„ E. J. Roe.
„ C. B. Hamlin.	„ F. Smith.
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For Prospectus, apply to

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Portman School of Pharmacy.

156, MARYLEBONE ROAD
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JULY MINOR.—A short special course for the July Examination will commence June 6th. Fee £2 2s.

This School presents the following advantages :—

A lofty, well-ventilated and well-appointed Laboratory.

A Museum containing a complete collection of specimens of Drugs, Chemical and B.P. Preparations.

Constant and careful supervision by the Principal of each student's work.

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In Medical Latin, Dispensing (Materia Medica, Pharmacy), Botany, Chemistry, Physics. Differ entirely from Postal Systems. Testimonials invariable. Satisfaction unanimous. Adapted for beginners and advanced students. 5s. per month.

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TRINITY SQ., BORO', LONDON.

DIRECTOR:—Mr. G. S. V. WILLS.

The next Session will commence on Monday, September 5th.

Students who are commencing their studies will find this a valuable opportunity of obtaining a thorough Pharmaceutical Education, and efficiently preparing themselves for the requirements of the Board of Examiners.

As an example of the success attending this College, reference can be made to the results of the Examinations, published in the advertisements of this School in the *Pharmaceutical Journal.*

Students desirous of entering should send in their names as early as possible, as the vacancies are fast filling.

Any diligent Student with ordinary ability, who is punctual in his attendance at the Lectures and Classes, may rely upon passing his Examination at the FIRST ATTEMPT.

A completely fitted Dispensary is attached to the College for the benefit of those students who require instruction in this department.

FEES. { To the October Examination ... ... £6 6s.
„ December „ ... ... £9 9s.
12 Months' Course (Minor and Major), £15 15s.

EVENING LECTURES.

Laboratory Instruction and Classes.—Gentlemen engaged during the day, and unable to leave business, may be prepared for the Pharmaceutical Examinations in the evening.

PASS LIST.

At the Examinations held last month, 2 Major students 27 Minor students, and 6 Preliminary students were successful in passing their examinations from this College. For names, see advertisement last week.

WILLS' UNIVERSAL POSTAL SYSTEM

FEES. { Minor Examination £1 1 0
Major „ 0 10 6
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Students who desire to commence to read up for their Examinations, but who are unable at present to leave their business engagements, are advised at once to enter under

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when they cannot fail to make rapid progress.

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"SYSTEMA OMNIA VINCIT."

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325, KENNINGTON ROAD, S.E

Director: Dr. MUTER, M.A., F.R.S. Ed., F.I.C., F.C.S., &c.

ESTABLISHED 1st OCTOBER, 1868.

THE NINETEENTH SESSION, 1886-7.

The last Term of the Session is now commencing.

For Fees, &c., apply to W. BAXTER, Secretary.

Massage and Electrical Treatment.

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The Pharmaceutical Journal AND Transactions.

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OF THE

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Professor ATTFIELD .....PRACTICAL CHEMISTRY.
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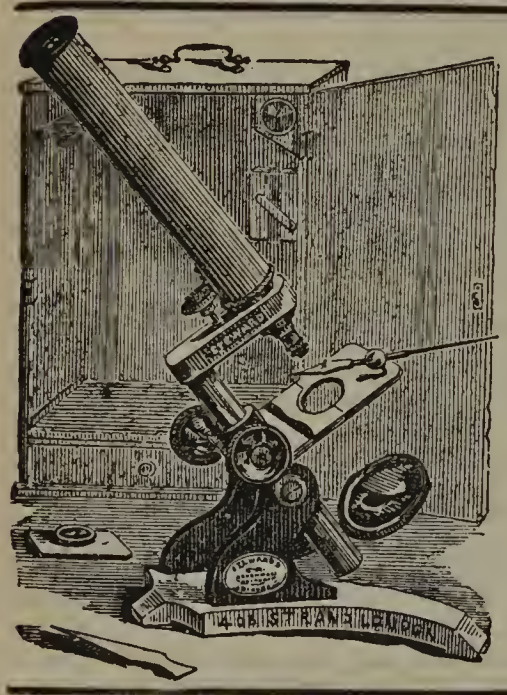

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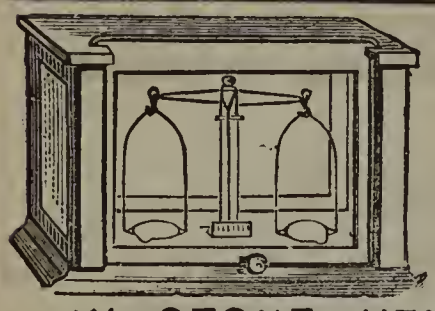

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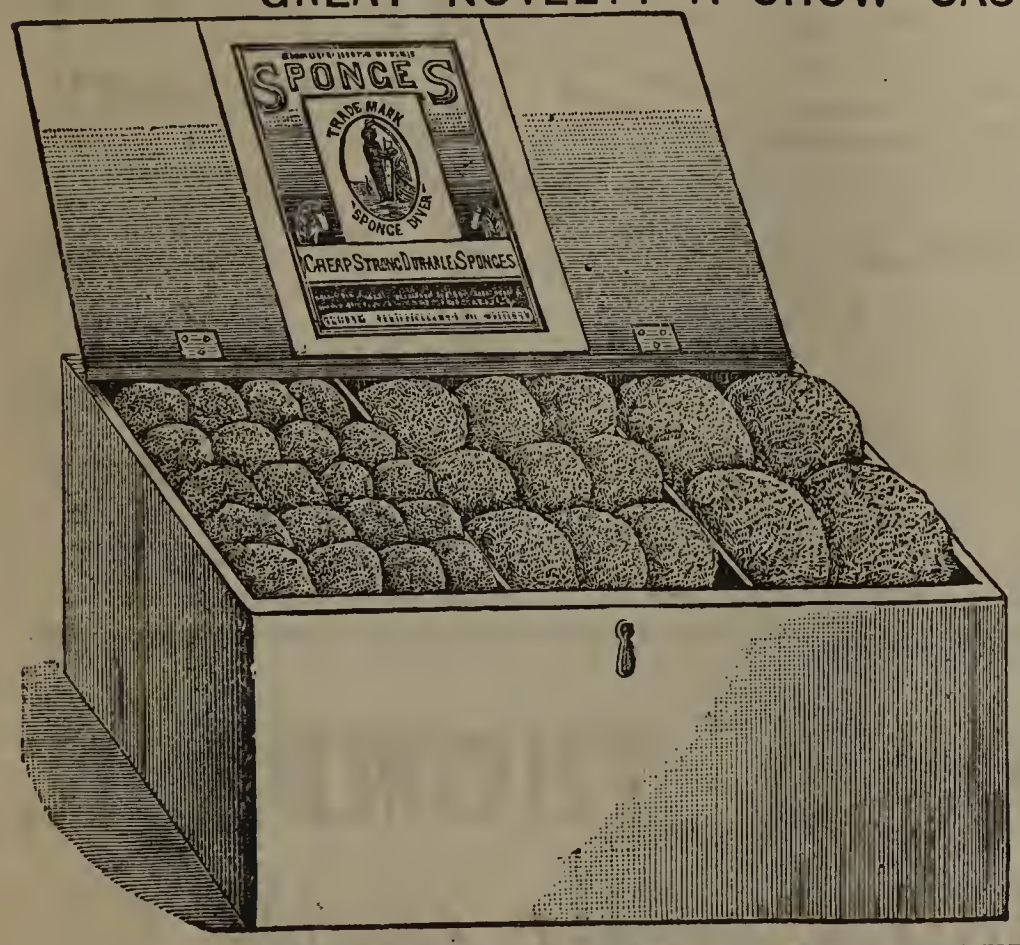

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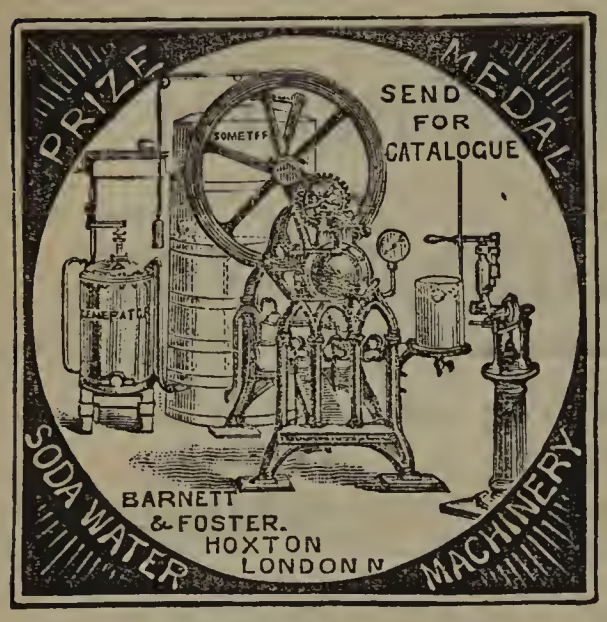

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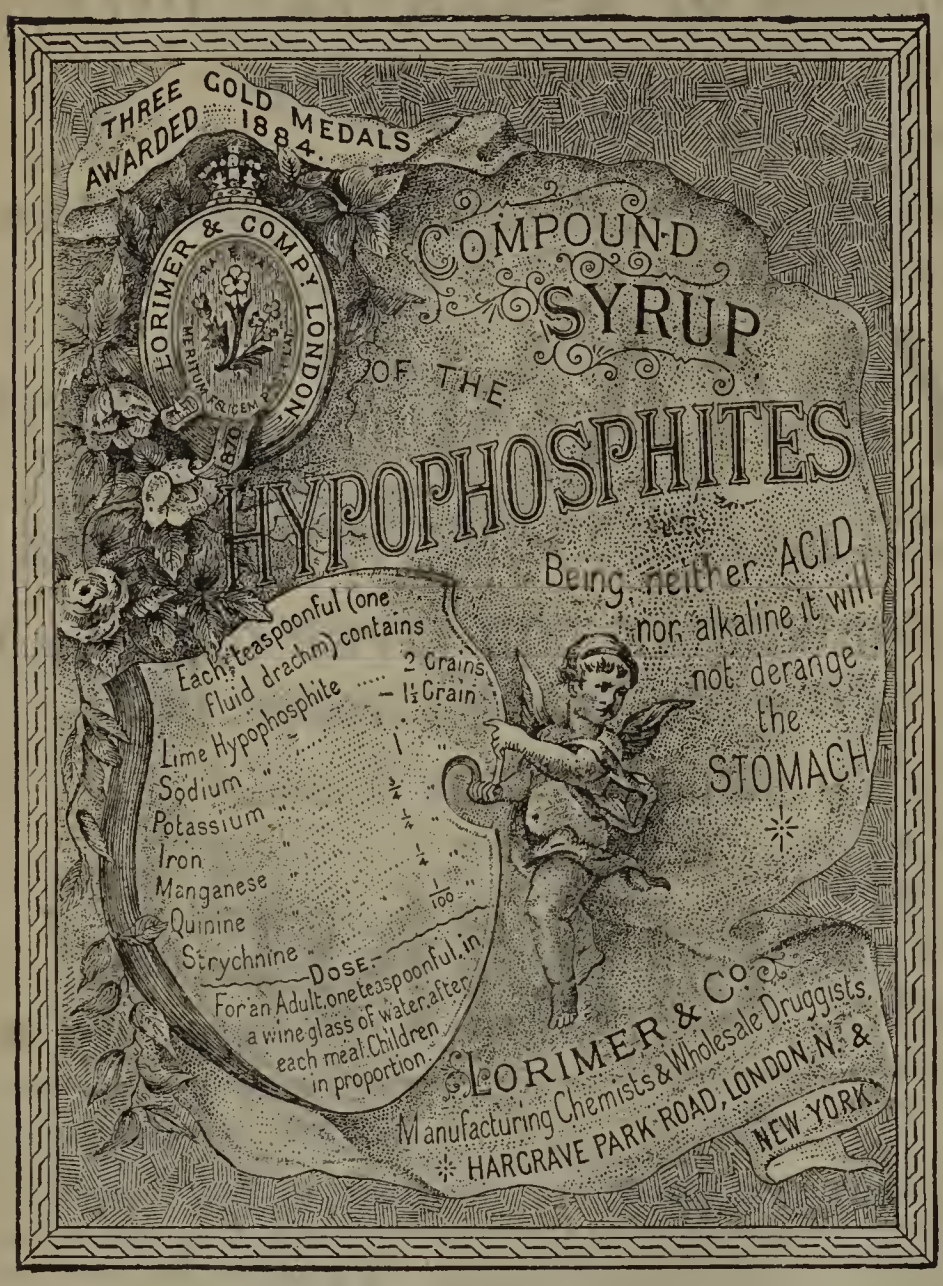

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ACCURATE METHOD OF DETERMINING SPECIFIC ROTATORY POWER.*

BY W. PEDDIE, B.SC., F.R.S.E.

The following method is based essentially upon the fact that the rotation of the plane of polarization by any substance is different for different wave-lengths.

Nicols prisms are used to polarize and analyse the light. If any substance which rotates the plane of polarization is placed between the two Nicols prisms when they are arranged so as to prevent the passage of light, coloured light passes through. If this light be examined by a spectroscope (direct-vision preferably) the spectrum is seen to be discontinuous, being crossed by one or more dark bands. The number of these bands depends on the amount of rotation produced by the substance. The particular kinds of light corresponding to the centres of any adjacent pair of these bands differ in rotation by 180°. If the analysing prism be rotated the bands shift their position in the spectrum.

A mirror is interposed between the prisms so as to cut off about one-half of the light coming directly through the apparatus. A beam of light is reflected from this mirror through the analysing prism and the spectroscope, and its spectrum is necessarily uncrosssed by dark bands. In this way two spectra are obtained in justaposition, the Fraunhofer lines in the one being continuous with those in the other. The uncrossed spectrum can be used to determine the exact kind of light corresponding to the centre of any dark band.

To determine the rotation for light of any particular wave-length, the analysing prism is turned round through an angle θ until the centre of the dark band in the one spectrum corresponds with that particular light in the other. If ρ be the total rotation for that light, we get $\rho = n\pi + \theta$. To determine n, the same process must be repeated for another kind of light, for which we get

$$\rho' = (n+x)\pi + \theta'.$$

In this equation x is the number of dark bands which cross the spectrum in positions intermediate between the two kinds of light for which ρ and ρ' are the rotations. Combining the two equations above with the approximate formula $\rho\lambda'^2 = \rho'\lambda^2$, where λ and λ' are the two wave-lengths considered, we get $\frac{n\pi+\theta}{(n+x)\pi+\theta'} = \frac{\lambda'^2}{\lambda^2}$. This equation determines n.

The method above described, in which position is substituted for tint, is superior in point of accuracy to any of the ordinary "neutral-tint" methods, and has the additional advantage of giving the rotation for light of a definite wave-length.

[*The discussion on this paper is printed on p.* 965.]

NOTE ON SOLUBILITIES OF MORPHINE HYDROCHLORIDE, SALICIN, AND GALLIC ACID.*

BY D. B. DOTT, F.I.C., F.R.S.E.

As the solubility of the under-noted compounds is variously stated in the ordinary books of reference I have made fresh determinations. For these, however, a high degree of accuracy is not claimed, as the instruments just lately at my disposal did not admit of very exact results.

The method employed has been described in former papers and need not be again detailed. The substance is digested in the menstruum until the solution is saturated, and the temperature having been noted, a portion of the solution is weighed and evaporated to complete dryness. The solubility is then obtained by deducting the weight of the dry substance from the weight of the solution and dividing the latter by the former. In the case of compounds which lose their water of hydration at the temperature required to dry them, a correction must evidently be made. The mean results of the experiments are given below :—

Solubility of Morphine Hydrochloride in Rectified Spirit.—One part is soluble in 40 parts at 16° C.

Solubility of Salicin in Rectified Spirit.—One part is soluble in 66 parts at 16° C.

Solubility of Gallic Acid in Water.—One part is soluble in 118 parts at 16° C.

[*The discussion on this paper is printed on p.* 965.]

NOTE ON THE PURIFICATION OF FIXED OILS.*

BY D. B. DOTT, F.I.C., F.R.S.E.

It is a matter of importance in pharmacy that the oils used in the preparation of ointments and for other purposes should be as pure as possible. I have devised a method for the purification of oils, which, although not yet thoroughly worked out, gives in some cases very good results. The process is briefly as follows :—The commercial oil is agitated with about a twentieth of its volume of 10 per cent. solution of potassium permanganate. Dilute sulphuric acid is then added and the mixture well shaken. After standing a sufficient time to allow the water to settle the oil is filtered. It is now found to be much improved in appearance, and is not, so far as I have yet observed, in any way deteriorated. With the oils of the Pharmacopœia I have only had time to try three experiments. The method seems to apply very well to olive and almond oils, and not to be so successful with linseed oil. I intend to have the process thoroughly tested, and to report the results on a future occasion.

I have to thank Mr. J. Rutherford Hill for assistance kindly rendered in these experiments.

[*The discussion on this paper is printed at p.* 965.]

A SIMPLE METHOD FOR PERCOLATION UNDER PRESSURE.*

BY THOMAS MABEN.

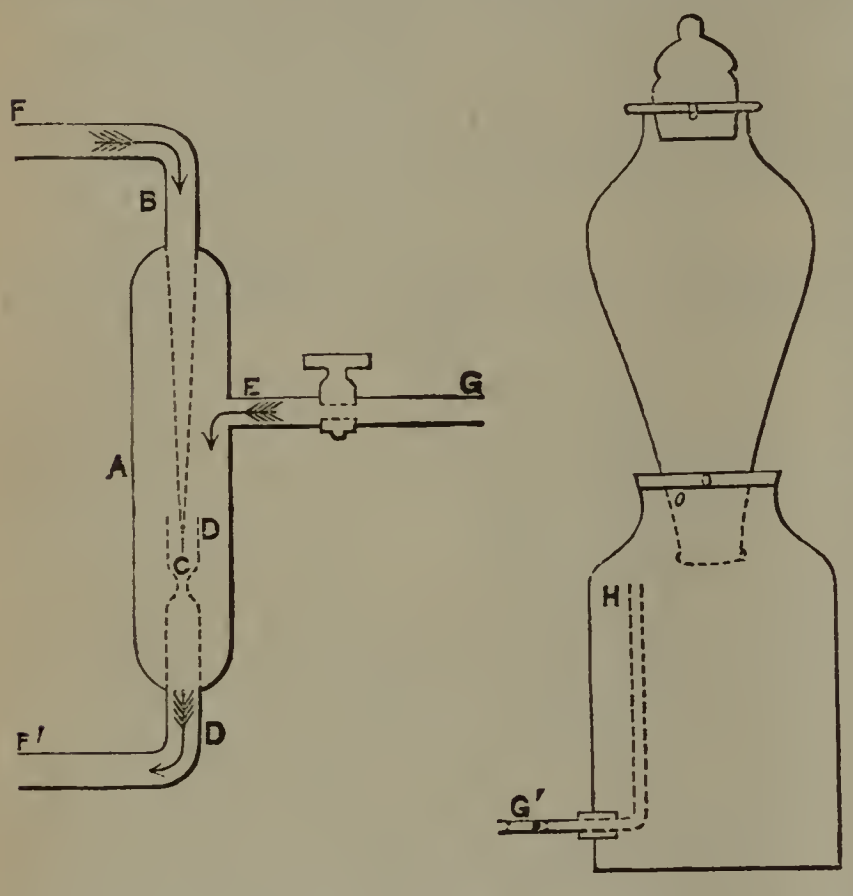
I have for some time past been in the habit of making use, in aid of percolation, of a simple contrivance which is perhaps not so well known as it deserves to be. As a rule, it is not desirable to hasten the process of percolation over much, but it does occasionally happen that it proceeds so slowly that we are glad to lend what assistance we can. The method I now adopt in such cases consists in the use of a vacuum pump, a piece of apparatus which is familiar enough in the laboratory, but of which I have not seen an arrangement whereby it may be conveniently adapted to pharmaceutical use on a small scale.

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, May 11.

* Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in Edinburgh, Wednesday, May 11.

Remington, in his 'Practice of Pharmacy,' refers to the use of the vacuum pump, but he contents himself with describing the construction of the pump, and leaves his readers to find out for themselves the best way of applying it.

The accompanying drawing illustrates the particular form of vacuum pump which I regard with most favour, one element which recommends it being its simplicity of construction; any tinsmith can put it together at little cost, and if properly made, it is remarkably efficient. These pumps may be bought in glass, but they are too fragile; and also in brass, but these are needlessly expensive, and are not as a rule provided with stop cocks.



The pump is made of brass throughout. A is a tube about 3½ inches long, and ¾ inch diameter, into which is soldered a smaller tube, B, the upper part of which may be conveniently bent to a right angle. This tube is gradually narrowed to the orifice, C, which is inserted about half an inch into the outlet tube, D. This tube, which is also soldered to A, may be cylindrical, but is preferably constricted about an inch below C. A connection having been made by means of india-rubber tubing between the main hydrant and F, the water is forced through C, and in passing into the outlet tube it rapidly creates a vacuum, and A is rapidly exhausted, the air being drawn through the annular space at D. A tube may be attached to F' if necessary to carry off the effluent water. The inlet tube for admission of air is attached laterally, and is provided with a stop cock, and when this is opened the air rushes into A, a continuous current being drawn through D to the outlet. In this way a stronger or weaker current of air may be produced varying according to the pressure of water.

Before the pump can be employed, it is of course necessary that the receiver of the percolator be air-tight. The plan I adopt is very simple. An ordinary York Glass Company percolator, the various parts of which can be made air-tight at will, is made use of; the tap is removed, and in its place is inserted a cork through which passes a glass tube, G'H, bent at right angles, as shown in the drawing. A small valve is fitted to G', which admits of the air passing freely through in the direction of the arrow, but prevents water flowing backwards should there be any tendency in that direction.

A tube, which must be of stout rubber or preferably with a coil of wire inside, otherwise it is certain to collapse owing to the pressure, connects G and G' and the apparatus is complete.

The apparatus may be wrought without the use of the valve at G', but in that case it is necessary to observe two precautions. An unvarying flow of water from the hydrant must be maintained, otherwise there is the probability that water will be drawn back into the receiver owing to the reduction of pressure, or rather on account of the transference of the pressure from the pump to the receiver, and, for the same reason, the stop-cock at E must be turned off before the flow of water is stopped at the hydrant.

If it be thought desirable to have a vacuum gauge to indicate the degree of exhaustion, it could easily be fitted on at E. The pump which I am using at present is able, with a moderate flow of water, to produce exhaustion equivalent to a pressure of about two atmospheres, which is more than sufficient for most purposes. I find that an extra pressure of 250 mm., or a total pressure of one and a third atmospheres is ample for ordinary percolation.

[*The discussion on this paper is printed on p.* 965.]

IRISH MOSS AS A SUBSTITUTE FOR GUM ACACIA IN PHARMACY.*

BY PETER BOA.

At the present time when the price of gum arabic is about five times what used to be considered its normal value it seems not inappropriate to introduce for consideration a subject such as I have to bring before you to-night. A mucilage of Irish moss, prepared by boiling in water, has been largely used in America for the emulsification of cod liver oil, but so far as I have been able to ascertain by liberal reference to journals published in that country and in this, its more extended pharmaceutical use has not been proposed.

Some years ago I made experiments with the moss mucilage as an emulsifier of cod liver oil, but my experience with it did not indicate any evidence of its superiority to other substances used for the same purpose, such as acacia and tragacanth. In consequence I abandoned further consideration of it, especially as the cost was not then an element of so urgent importance as it now is.

A few months since, however, in conversation with a pharmaceutical friend, the subject of a substitute for acacia came up. Remembering my previous experiments with Irish moss I thought this substance might possess some qualities which would make it worth considering with this object in view. Since then I have from time to time as leisure permitted gone into the subject, and the results of my experiments, so far as they appear to me to be worth recording, I propose to lay before you.

The only two British species of algæ which yield a mucilaginous jelly with water are *Gelideum cor-*

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, May 11.

neum and *Chondrus crispus*, or Irish moss. The latter is the more plentiful, and being a well-known article of commerce is easily obtainable. The composition of commercial Irish moss is given by Church as—

Water	18·8
Albuminoids	9·4
Mucilage	55·4
Cellulose	2·2
Mineral matter	14·2
	100·0

Stanford says it yielded him 63·7 per cent. of carragheenin, or vegetable jelly; this probably includes the albuminoids and mucilage given in Church's analysis.

The mucilage may be obtained by boiling, by heating on a water-bath, and by cold maceration. The usual method is boiling. However, having put a quantity of the moss into water to soak one afternoon, and being unable to attend to it till the next day, I found when I examined it that the water was distinctly viscous. By putting a larger quantity of moss into a smaller quantity of water, and macerating with occasional gentle stirring for twenty-four hours, I obtained a mucilage of about three-fourths the viscosity of acacia mucilage.

At the commencement I encountered a difficulty which threatened to be a serious objection. I found it exceedingly troublesome to get the mucilage clear, the insoluble particles suspended in it being so minute that the straining medium necessary to exclude them required to be so fine that the mucilage would scarcely pass through it. Mr. Huested (*Pharm. Journ.*, July 16, 1881, p. 49) records similar experience. In a case where the small particles in suspension would not be objectionable, a fairly presentable product may be obtained by using muslin or calico as the straining material, and gently stirring or pressing. For emulsions this serves admirably. In a clear mixture, however, the particles become objectionably evident when the mucilage is diluted. To obtain a clear preparation Mr. Huested recommends that the mucilage while hot should be poured into a flannel filtering-bag and allowed to drain through, no pressure or stirring being employed. Proceeding in a similar way I failed to get satisfactory results. I could neither get the mucilage to run through reasonably rapidly nor obtain it so clear as I desired. It may be that Mr. Huested's manipulation is superior to mine, or his mucilage was not so clear as that which I have now succeeded in preparing. After many failures, the details of which I need not give, I found that by using a hot water funnel and straining the mucilage through absorbent cotton wool supported on muslin, a preparation clear enough for all but exceptional purposes could be obtained with comparatively little difficulty. If a perfectly water-clear preparation be required, it may be obtained by making a weak mucilage, filtering it clear, and then evaporating to the thickness required. If a clear jelly were wanted this would be the only way to prepare it, because a decoction of this consistence could not be strained, even when kept hot, in anything like a reasonable time, if at all.

A quarter of an ounce of moss, washed free from dust and sand, soaked in 24 ozs. of cold water for an hour or so, boiled gently for five minutes or heated on a water-bath for double the time, and strained in the manner I have described, yields about 18 ozs. of mucilage closely resembling in appearance and viscosity the acacia preparation, and possessing as little taste.

I have observed that the clear mucilage has less taste,—"flavour" perhaps I should say,—than that which has not been freed from insoluble particles.

A quarter of an ounce macerated in 4 ozs. of cold water for twenty-four hours, or longer, gives a mucilage such as that to which I have already made reference.

Specimens of these and of some other strengths are on the table. I have observed variations in the results from different parcels of the moss.

Comparing the moss mucilage with acacia mucilage in combinations, I find that it serves as well as the latter for chalk mixture. Guaiac. mixture made with it does not so soon acquire a greenish tinge as that made with acacia; oxidation appears to be retarded and presumably the moss is therefore to be preferred. For suspending copaiba it is superior to acacia, separation taking place much more slowly and less completely. Part of the copaiba remains in an emulsified state at the bottom of the bottle when moss is used, but with acacia the liquid in the lower part of the bottle is free from anything of that kind, all the oleoresin having risen to the top.

For emulsifying cod liver oil it is greatly superior to acacia in point of preventing separation, but a finer division of the oil can be obtained by the use of acacia in greater proportion than the equivalent.

Moss mucilage, ℥vj., cod liver oil, ℥j., and water ℥ij., produce an emulsion that is practically inseparable. Using ℥vj. acacia mucilage, ℥j. cod liver oil, and ℥ij. water, the product obtained quickly separates.

It should not be used for suspending heavy powders without some caution, for I find that when it is employed to suspend subnitrate of bismuth, the bismuth when once it settles down will not again shake up. Where there is no objection of this kind it is superior to ordinary mucilage.

Specimens are shown illustrative of the results of these comparative experiments.

In regard to compatibility moss mucilage forms a clear jelly with subacetate of lead solution; it is miscible with rectified spirit and dilute nitric acid; perchloride of iron gives a slight gelatinous precipitate.

The preparation keeps good for some weeks in full bottles without any preservative. One specimen is shown that has been kept in a partially filled bottle in the front shop for two months and it can hardly be said to be bad; other specimens, however, of about the same age have become mouldy on the top. It does not sour lik acacia mucilage.

Pereira says that *Chondrus crispus* has a popular reputation for pulmonary complaints, chronic diarrhœa and irritation of the kidneys and bladder. The mucilage strikes one as being well suited for use with medicines for any of these complaints; a few ounces of it in a cough mixture, for example. It may be used freely for it is readily digested—the melting point of the jelly being 80° F., not much above that of isinglass jelly used for invalids.

[*The discussion on this paper is printed on p.* 965.]

The Redwood Testimonial Fund.

Presentation of a Portrait of Professor Redwood to the Pharmaceutical Society.

A meeting of the subscribers to this Fund was held on Wednesday last, in the theatre of the Pharmaceutical Society, under the presidency of Mr. Michael Carteighe, Chairman of the Executive Committee and President of the Pharmaceutical Society.

The Chairman: Gentlemen, you all know the object for which we are gathered together in this hall to-day, viz., to witness the concluding formal ceremony in connection with the Redwood Testimonial Fund. Most of you are no doubt aware that a considerable sum of money has been contributed by members of the Society, distinguished friends and old pupils of Dr. Redwood, and as the result of the subscription it has been decided to found a scholarship in connection with the Society's School, to be named, for ever, the "Redwood Scholarship," and, in addition, that a portrait of our Emeritus-Professor should be painted and placed on the walls of the Society's house, in order that his features may ever be before the pupils and teachers of the Society. Finally, with a view to the proper gratification of those who are near and dear to the Professor, we have been able to arrange for a replica of this portrait, which will, no doubt, be handed down as an heirloom in his family. The replica is not quite ready, but we will, if you please, consider it is ready for the purposes of the proceedings to-day. I will now ask Dr. Garrod, as a member of the Executive Committee, to be kind enough, on behalf of the subscribers to present the portrait to the Society.

Dr. A. B. Garrod, F.R.S., F.R.C.P.: Mr. President, I am requested by the Committee of the Redwood Testimouial Fund to take a part in this day's proceedings, and will endeavour to discharge this small part to the best of my abilities. The origin of the Testimonial may be thus stated:—At a meeting of the friends and former pupils of Professor Redwood it was resolved: (1) "That some public recognition be made of the long and valuable services rendered to pharmacy and to the sciences connected therewith by Emeritus-Professor Redwood." (2) "That it is desirable that the form of recognition be the foundation of a Redwood Scholarship, to be held in connection with the School of the Pharmaceutical Society. The surplus, if sufficient, to be appropriated to the painting of a portrait of Professor Redwood, to be placed in the House of the Pharmaceutical Society." A General Executive Committee was then formed, numbering among its members many very influential names, including the Presidents of numerous important societies and corporations. The success of this Committee has been sufficient not only to found the Scholarship, but likewise to enable a portrait of Professor Redwood to be executed by a very eminent portrait painter, Mr. Sydney Hodges; and my duty to-day is, on behalf of the subscribers to this Testimonial, to hand over to you, Mr. President, on behalf of, and as representing the Pharmaceutical Society of Great Britain, this portrait, in order that it may adorn the walls of this building, and be the means of daily calling to the minds of the members of the Society the great benefits Professor Redwood has rendered, and to stimulate the students to endeavour to follow in his footsteps. (The portrait was then unveiled amidst considerable applause.) All who know Professor Redwood must admit that this is a very admirable likeness, and does great credit to the artist. It is the Professor in his best moments. It is not for me to attempt to enumerate all the services which your Professor has rendered, not only to this Society, but to chemistry, pharmacy and pharmaceutical chemistry. Most of those present are as well, or even better, acquainted with them than myself. I shall, however, just enumerate some of the services that Professor Redwood has done. In the year 1842 (just 44 years ago) Dr. Redwood was appointed Professor of Pharmacy to the Pharmaceutical Society, and in 1844 Director of the Chemical Laboratories. In 1846 he succeeded the late Professor Fownes as Professor of Chemistry. In these several capacities in the first instance with Fownes, Pereira, and Thomson, he laboured earnestly and with marked success to promote the cause of scientific education in pharmacy, and at the present time the majority of practising pharmacists, many medical men, and not a few scientific chemists, owe much of their early scientific knowledge to his teaching. Professor Redwood's official connection with the Chemical Society dates from the year 1852, when he was appointed Secretary in conjunction with the late Sir Benjamin Brodie, a post which he held, subsequently with Professor Odling, until 1865, when he undertook the duties of Treasurer until 1870. In 1846 the Cavendish Society was founded, with Professor Redwood as Secretary, a post which he retained during the whole period of its existence. Professor Redwood was also associated first with the London and then with the British Pharmacopœia. I am told that he began to act as Secretary in 1854 to the Pharmacopœia Committee, which was then under the Royal College of Physicians, but in the autumn of 1859 it was transferred from the College of Physicians and put into the hands of the Medical Council, when not only the London, but the united Pharmacopœia of London, Edinburgh and Dublin was ordered to be produced, called the British Pharmacopœia. The Committee held its sittings up to 1864, although the London College of Physicians had ceased its functions after 1858 working from the year 1858 in conjunction with the Medical Council. In 1865 Professor Redwood was appointed by the Medical Council to edit a new edition of the British Pharmacopœia, which appeared in 1867, the edition with Addenda which appeared in 1874, and again the recent edition af 1885. Professor Redwood's 'Supplement to the Pharmacopœia' has long been out of print, but is a book which had a world-wide reputation as an encyclopædia of materia medica. The first edition appeared in 1847, the second in 1848, the third and last in 1857. In 1840 Professor Redwood published a manual of 'Practical Pharmacy,' founded on that of Dr. Mohr. In 1872 an abridged edition of Pereira's 'Materia Medica' was published, to which Professor Redwood contributed the chemical and pharmaceutical portion. In 1841 Professor Redwood was associated with the late Mr. Jacob Bell in the foundation of the *Pharmaceutical Journal*, of which he subsequently became editor, and continued in this capacity until 1870. Its pages bear witness to the extent of his contributions to pharmacy and to the sciences on which it depends. In 1856 Professor Redwood, in conjunction with Professors Graham and Hofmann, was appointed to report to the Chairman of the Board of Inland Revenue, "On the Supply of Spirit free from Duty." The foregoing sketch, although it includes only the chief features in Professor Redwood's career, shows how largely he has contributed to the development of materia

medica, how much purely honorary work he has done for the science of chemistry, and how for more than half a century he has devoted himself to the promotion of the scientific sides of pharmacy, more particularly in connection with the organization of the Pharmaceutical Society. I will now say a few words with regard to my own personal knowledge of Professor Redwood. I believe I make no over-statement when I say I have had the pleasure of his acquaintance for nearly forty-five years, and that I regard him as so intimately connected or bound up with this Society as to form a part and parcel of it. I have also had the advantage of hearing him lecture on several occasions, and although very many years have passed away since I heard one particular lecture delivered to this Society, on Magnetism, still I retain such a vivid remembrance of the clearness, simplicity, and force with which he treated the subject, that I ever afterwards regarded it as a model lecture—one equalling Faraday's best efforts, and one the style of which could with advantage be copied by others. I have also had the advantage of knowing Professor Redwood in connection with the Chemical Society in its early days, and shall not forget a visit with him, in conjunction with Professor Graham, the late Master of the Mint, Professor Fownes and many others, first to Kew, to see some early attempts at electrical telegraphy, and afterwards to a less scientific, but perhaps equally interesting entertainment at Richmond. In conclusion, I feel sure that no more worthy recipient of a testimonial could be found than Professor Redwood, and I can only add one more remark, namely, that all the subscribers to it and in fact all the chemical and pharmaceutical world, hope and trust that he may live long to enjoy the honours and the good wishes he has obtained in his long and useful career. I have great pleasure in handing to you, Sir, as the President of the Pharmaceutical Society, this admirable portrait, and also in stating that the replica is being made and will shortly be delivered to the Professor.

Loud applause followed, and three hearty cheers were then given for the Professor.

The CHAIRMAN: On behalf of the Pharmaceutical Society, which I represent officially here to-day, I beg to tender our thanks to the subscribers for giving us the opportunity of having this portrait upon our walls. I count it one of the most pleasant episodes that is attached to my presidential career that on this, the last day, I should have the opportunity of receiving, on the part of the Society, so honourable a commission as accepting a life-like portrait of my old friend, Professor Redwood, and, as one of his former pupils, I am still one of his grateful admirers. There have been great difficulties to contend with in teaching pharmacy and chemistry and the various branches of knowledge connected with our craft, but I venture to think we can hardly realize what those difficulties must have been when the Professor first commenced his work in 1842. There are difficulties now, but the difficulties then must have been immense. I can corroborate what has been said with regard to the excellence of the Professor's teaching, not only from my own experience, but from what my friends have said to me. There are many who think that as a lecturer on physical science our Emeritus-Professor was unequalled—certainly not surpassed. I congratulate myself on being the recipient for you, and I congratulate the Society at large that we have another addition to our gallery of worthies. This portrait will be placed on the walls of the Pharmaceutical Society among those of other gentlemen who have given up so large a portion of their lives to the Society. The Professor will be in the company of his old friends William Allen, Jacob Bell, Thomas Hills and George Webb Sandford. As this is a typical representation of the handing over of the replica, perhaps it will not be amiss to allow the Professor to thank us for that portion of the work. We do not ask him to say much; one can conceive that he may feel it desirable that he should not say too much; but a few words from him, I am sure, would be gratifying to you, as many persons have come from the country in order to be present to-day.

Professor REDWOOD (who on rising was loudly cheered) said: Mr. President, the kind words which you and Dr. Garrod have expressed and the kind and generous acts that so many friends, including not only pharmacists but distinguished medical and other scientific men, have performed with reference to me, impose upon me a debt of gratitude which I feel that I cannot on this occasion adequately respond to or ever acquit myself of. I am indeed deeply sensible of the honour which is conferred upon me by those who have contributed to the carrying out of this Testimonial, and I am also greatly indebted to the originators and promoters of the undertaking for the very judicious estimate they formed of my feeling and the manner in which they have carried out the Testimonial. As an expression of approval of long continued services, rendered in an endeavour to advance the interests of Pharmacy and the Pharmaceutical Society, I acquiesce in and recognize and accept most gratefully what has been so graciously designed and accomplished. If I may be permitted to express an opinion, perhaps I should rather say to throw out a suggestion, with reference to the scholarship which forms part of the testimonial, it would be that the means which have been provided for aiding students in the acquirement of the knowledge which is requisite to make them good and efficient pharmacists may be in some way made available for extending the time which previously successful students may desire to devote to the further prosecution of their scientific studies. The time which is too frequently allotted by pharmaceutical students to systematic study is, in my opinion, inadequate to the requirements of a sound and thorough pharmaceutical education. Mr. President, Dr. Garrod and gentlemen, I thank you most cordially for the good wishes you have expressed towards me, and feeling, as I do, that I have still strength and health for the performance of yet much work, I hope I shall be enabled to devote such energies as I retain in the furtherance of the cause to which I have been so long devoted.

The PRESIDENT: Gentlemen, I have now the pleasing duty of asking you to convey your thanks to Dr. Garrod for his kindness in attending here to-day and performing his part of the ceremony.

The vote was carried by acclamation.

Dr. GARROD: Gentlemen, I am much obliged to you for your kindness. Although I do not often attend your meetings, I have been for many years an Honorary Member of this Society, and I believe about forty years ago I had the honour of lecturing here, chiefly through the kindness of Professor Redwood.

The proceedings then terminated.

THE BENEVOLENT FUND DINNER.

This dinner, which it has been of late the custom to hold decennially on behalf of the Benevolent Fund, took place on Tuesday evening at the Freemasons' Hall, Great Queen Street, Mr. Michael Carteighe, President, in the chair. There was a very large assemblage, about two hundred and forty being present, and the whole arrangement seemed to give every satisfaction to the guests.

The PRESIDENT, in proposing "The Queen," remarked on the pleasing coincidence that the decennial dinner of the Benevolent Fund should fall in the same year as the Jubilee of her Majesty's reign, which would cause them all to drink Her Majesty's health, if possible, with more than the ordinary enthusiasm with which it was always received in every assembly of Englishmen.

The toast having been drunk, and the National Anthem having been sung,

The PRESIDENT proposed "The Prince and Princess of Wales and the rest of the Royal Family." He remarked on the great advantage it was to have in various parts of the kingdom the members of the Royal family taking part in charitable and other public movements. The social life of a nation was fully as important as its political life, and it was very gratifying to know that the Queen's family had for many years been foremost in everything which tended to advance and brighten the social life of those amongst whom their lot was cast. The Prince of Wales had a very difficult position to fill, for he had almost to act the part of a king without being one. Those who had had the honour of being present at any gathering at which His Royal Highness had presided would agree that for the first subject of the realm he was *facile princeps*, and as for the Princess of Wales everyone would always feel they owed a debt to Denmark for sending her to make a home amongst them.

The toast having been enthusiastically received and followed by a song,

The PRESIDENT proposed the toast of the evening, "Prosperity to the Benevolent Fund of the Pharmaceutical Society." He said he would remind those who might have forgotten it that though the Society had a dinner annually, every ten years there was a Benevolent Fund dinner, and so it came to pass that evening, as they believed that benevolence should be asked for from their own craft rather than from outsiders, they had not invited members of learned societies and others who might construe the invitation as meaning a request for a donation of five guineas. The title of the Fund being associated with the Pharmaceutical Society was somewhat misleading, although perfectly correct, as it was a Benevolent Fund originally started by the Pharmaceutical Society, and one which was dispensed by the Society, but its more correct designation would be the Benevolent Fund of Chemists and Druggists. To those who had not followed the history of the Pharmaceutical Society he might explain the beginning of the Fund. The Society was established by royal charter in 1842, one of its object being to provide a fund for the relief of its members, and accordingly money was subscribed, and from time to time relief was given to members and associates of the Society. The Fund gradually and steadily increased until 1852, when the first Pharmacy Act was passed, and the original objects of the charter were confirmed, no change being made in the mode of distribution of the Fund. So matters remained until 1868, when one of his predecessors in the presidential chair, Mr. Sandford, conceived the idea that it would be a great and noble thing to take power in the Act of Parliament then passed, to make every member of the craft, every one who was registered as a chemist and druggist, whether he subscribed to the Fund or belonged to the Society or not, eligible for relief from the Fund. They owed much to Mr. Sandford, much more than many were aware of, but that one thing especially they owed to him, and to the tenacity of purpose which he then showed, that the benefits of the Benevolent Fund should be available to everyone on the Register. Accordingly powers were given in the Act of 1868 to distribute the Fund in the manner in which it had been administered since that time, to all persons on the Register of Chemists and Druggists, and to their widows and children. Considering the ups and downs of life, and the hard times through which all had recently been passing, it was to the credit of chemists and druggists that their self-reliance was such that the number of cases relieved, although large, was not, in proportion to those on the Register, so great as in some other bodies. The duty of the Society in regard to this Fund was that of a trustee. It was the trustee and distributor of the Fund, and it appealed to everyone, but especially to everyone connected with the craft, for assistance, on the principle that a subscription, however small, continued from year to year, was the best support which any trustee could have in distributing a charity—better than thousands of pounds of invested capital. Some might differ from him, but he ventured to think that if there were some thousands of pounds contributed annually in small sums, the difficulties connected with the Benevolent Fund might be faced with comparative comfort. He addressed himself in the first instance to those whose means were comparatively small, who could subscribe something between 2*s.* 6*d.* and a guinea a year, and he asked them to do so. He did not ask for large sums, but they all ought to subscribe; not because at some future time they might need assistance, but on the ground that it was the duty of every craft to provide for the unfortunate belonging to it. Hitherto, the Fund had been relatively more successful in receiving moderately large sums from a few prosperous members of the trade than in being supported by small subscriptions from the mass. They wanted, of course, both sections to combine for the purpose of carrying on the work, and he should like to say that during the last ten years they had dispensed in the shape of casual grants, in sums varying from £5 to £20, no less than £6000. They had also paid to annuitants no less than £11,300 nearly in the same time. Last year nearly £1600 were distributed to annuitants, though the income from invested property was only £781. Some persons thought they had no right to elect annuitants unless there were invested capital sufficient to meet their annuities, but he belonged to a Council who had traversed that position, and had said boldly, "We will back our subscriptions against the invested capital." He thought if they were prepared to relieve those who were in urgent distress, they might appeal to the present generation to give small sums annually to meet the expense, when they could not expect them to contribute large sums to be invested for the benefit of future generations. On these grounds the Council had recommended the election of a much larger number of annuitants than would be justifiable by ordinary economic laws, and he was happy to say that the members of the trade had responded heartily to the call. He did not complain of what had been done; on the contrary, many had given handsomely; but still there were a large number who for some reason or another held aloof. But he thought this must be owing to a mistaken notion that the Fund was reserved exclusively for members of the Society, and when they knew, as they would through the medium of the press, that this Fund was available for everyone who was or had been on the Register, as well as his widow and children, he thought they would all regard it as their duty to contribute a small sum annually to its resources. The total sum paid away during the last ten years was roughly £17,200, and though he did not wish to bring any undue pressure to bear, he did submit that at this festival, which was held once only in every ten years, whilst in most charities it was an annual affair, they might look for some substantial addition to the subscriptions. There were a certain number of friends who would always do their best, but they wanted a large

number of small subscribers spread all over the country in order to carry on the operations of the Fund satisfactorily. They pleaded for further support because they had not the means to elect all the annuitants who presented themselves each year, and secondly the question arose how far the sums paid were adequate to the purpose contemplated. The annuity fixed for a man or woman at fifty, the lowest age at which one could be elected, was £30, whilst at sixty-five the sum was increased to £35; but he thought this sum too small in many cases, and he hoped that some day they would be able to offer to a distressed chemist and druggist or his widow an annuity of £50. Still, until they were in a position to do so, he thought the wisest policy was to increase the number of small annuities; but if the generosity of the subscribers increased, so that there was a substantial addition to the annual income, he hoped that in a few years they might see their way to also increase the amount of the annuities. The casual grants also were extremely useful. Every case was investigated with the greatest care. In some cases money was voted for purposes which were not fully explained in print, because it was not desirable to give minute details; but there were cases in which a grant of £20 or £25, or, if they were able to afford it, of £50, might be the means of putting a whole family in a position to get their own living. They had been obliged to hesitate from time to time in this work, because, having regard to the state of the Fund and number of applicants, it was difficult to go beyond £15 or £20 in an ordinary grant, but it seemed to him that the policy which had been adopted during the last ten years was a wise one, viz., that of dealing, as far as possible, with all eligible cases, and in the case of those over fifty years of age, placing them as soon as possible on the list of annuitants. Casual grants were not always the most satisfactory way of relieving distress, though they were an essential part of it, and frequently preceded the grant of an annuity. During the last ten years the amount spent in this way had been practically the same, viz, about £600 or £700 a year. This would seem to show that the distress which occurred was very largely one which arose at a time when the machine was worn out. When a man over fifty came for relief, suffering from ill-health, there was not much need to inquire how it came about. A large number of their body had to work many hours a day for a very small remuneration, and it was no wonder if they found, at the age of fifty or fifty-five, that they were not capable of doing the work they were in early days. In conclusion, he invited all to drink the toast with enthusiasm, and to do their utmost for a fund which was so catholic and wide-spreading in its operations.

The VICE-PRESIDENT (Mr. T. P. GOSTLING) proposed the next toast—"The Pharmaceutical Conference." While the Pharmaceutical Society was doing its work of education and carrying on the business of the Society in all its multifarious details, the Conference was steadily pursuing the work of pharmaceutical research, and since its institution had done a good and great work, not only directly but indirectly, by stimulating pharmacists to greater interest in this matter. It was therefore fitting at all suitable times to remember the work of the Conference, and to do honour to its members, and on the present occasion, which was devoted to the interests of the Benevolent Fund, it was especially fitting to call attention to it, since it would necessarily advance the interests of pharmacy, and increased knowledge and education were the only means which would be effectual in so doing. If the interests of pharmacy were advanced, there would be fewer applicants for the aid of the Benevolent Fund. He begged to associate with the toast the name of the President of the Conference, Mr. Atkins of Salisbury.

Mr. S. R. ATKINS said he counted it a great honour to be allowed on this occasion to respond to this toast, having been elected for the present year President of the Conference, and being thus called upon to succeed many distinguished men whose achievements he could only hope humbly to imitate. With regard to the Conference he would only say this, that it was established in 1863 for the twofold purpose of promoting pharmaceutical research and true freemasonry amongst pharmacists, and both these objects had been to a large extent achieved. All human institutions failed to some extent in the objects contemplated, but he ventured confidently to assert that, reviewing the history of the last twenty-four years, those two objects had been largely accomplished. If original research had not been prosecuted with the avidity and the results which were then hoped, they were not alone in that matter, for he believed that England had yet to make up a good deal of leeway in comparison with France and Germany in the matter of original research. However, he believed that a large amount of real, true, substantial work had been done, as could be seen by a glance at the 'Year Book and Transactions' of the Conference. If there were any doubt about this matter there could be none with regard to the fact that a great deal of charming loving intercourse had been promoted amongst the members of the craft. Of all men he thought pharmacists needed that association; the very nature of their calling, being isolated, demanded from them that whenever occasion afforded they should meet together for interchange of social life. The Pharmaceutical Conference was born in the year 1863, at Newcastle, of very respectable parentage. It passed through the period of dentition and various other infantile diseases remarkably easily and well; it had grown up a strong hardy boy, and a remarkably intelligent youth. He had had remarkable opportunities of travelling in this country, had moved all over the kingdom, had been invited to Canada, though he was so much engaged at home that he could not go, but he received very large accessions of support, strength and sympathy from his colonial cousins, which he desired most cordially to recognize. And now, conscious of his athleticism and full manly vigour, having reached the age of twenty-four, he was invited to Manchester, and there, with the shade of Dalton of the past, and the substantial form of Roscoe of to-day, and with the hearty invitation of men like Benger, Woolley and others, he believed that for the immediate future of the Conference there was nothing but hearty congratulation, and that if they were true to themselves there was a brilliant future for pharmaceutical work and social intercourse on the part of the Pharmaceutical Conference.

The SECRETARY then read the list of subscriptions and donations, which will be found on the following page.

Dr. LANGDON DOWN next proposed the health of the President, saying that he need not, in the company of pharmacists, expatiate on his qualities, or refer to the time, a quarter of a century ago, when he headed the prize lists in four departments. The gentleman to whom they wished to do honour was not only President for the evening, but the distinguished President of the Pharmaceutical Society, and whether one had regard to the way in which he presided over such assemblies, or received his guests as he would to-morrow evening at the Kensington Museum, or whether he presided over Committees, urging, and directing, and guiding the business of a Redwood Testimonial Fund, in all these positions he was distinguished for business tact, good sense and infinite energy. Whatever he undertook to do, he did in a thorough British spirit, whether climbing the mountains in Switzerland, or urging on the work of pharmaceutical education at home. He, therefore, asked them all to drink enthusiastically the health of the President, than whom no one could be more genial, more able, or more worthy.

The PRESIDENT, in responding, having thanked the company for the cordial manner in which the toast had been received, said that Dr. Langdon Down, though in some respects a stranger, would not allow himself to be

considered one there. Having begun his career as a student of the Pharmaceutical Society his sympathies with it were so strong, that he had never failed to attend the annual dinner since he had been in practice in London, and, therefore, when this toast was thus proposed he felt that it was an additional honour to the Society of which he was President, and of which Dr. Langdon Down was an Honorary Member. His friend, Mr. Atkins, the President of the Conference, had referred to the good effect of the Conference in encouraging a kindly fellow-feeling amongst members in different parts of the country. One of the difficulties the Society had to encounter was that it was difficult in the short time available at any gathering, especially at any gathering in London, to convey to all those of the present generation any idea of the work the Society had done in the past. It had been suggested that the President should be peripatetic; that he should be sent round like a professor of physical science to preach the pharmaceutical faith throughout the land. There was a good deal to be said in favour of that view, and if desires alone could be considered in such cases, there might be Presidents who would be willing to attempt even that; but the exigencies of life made it necessary for a President as well as for a Society to live, and, therefore, it was almost impossible for him to march round the country and talk to his fellow members of the work which had been done, and which had yet to be done. Fortunately they had now a press which represented their doings, and reported the proceedings so completely and thoroughly that if they did not know what the policy of the Society was, it was their own fault. At all events the Council had never spared any pains to let it be known all over the kingdom, as widely as possible, what the objects contemplated were, namely, to educate the chemist and druggist so that he might claim from the public at large an esteem and consideration above that of an ordinary tradesman in the work he had to do. He had found throughout his life that that consideration was readily accorded by every intelligent person to whom he spoke on the subject, but the great difficulty was that the members on their own ground were sometimes not courageous enough to hold to the doctrine that knowledge was not only power, but ought to be worth money, and consequently they had difficulties to face which at times appeared almost insurmountable. Still he did not hesitate to say that the prosperity of every member of the craft in future would be directly proportional to his educational qualification. The individual should be educated—not over-educated—but educated up to a substantial standpoint in his special subjects above those who came to him for medicines. In proportion as he did that he would succeed. There was no chance for the pharmacist of the future if he thought he was to carry on the battle of life on capital and commercial principles; he must bring to bear on every work he did that skill and knowledge which the Society had been striving to give him. They were all aware that the Council was promoting a measure in Parliament with the object of more completely accomplishing that aim. He knew that a number of candidates, and fathers whose sons would soon be coming up for examination, were more or less alarmed at the proposition, and had an idea that the examinations of the Society were going to be increased in stringency, so as to make it almost impossible for men to enter the trade; but he begged to give the most emphatic denial to that idea. The object was not to increase the stringency of the examinations, but to demand from the candidates evidence of training. Every craft with which they were acquainted depended for success on the amount of skill and knowledge acquired by the individual. The carpenter, the painter, the plasterer, in fact every craftsman obtained his skill by a process of training. Chemists, unfortunately, were certified to have skill and knowledge on the narrow basis of an examination. For a long time it had been felt that this was not the right course to pursue, but they had been unable in former years to persuade the Legislature that their efforts to obtain educational facilities were not connected with the idea of forming a trades-union. To show that this was not so, he appealed fearlessly to everything the Society had done in the past; its object had not been to take fees from candidates for examination, and put them into the coffers of the Society, but on the contrary, to spend the surplus obtained from examination fees, together with the voluntary subscriptions of the members, associates, and apprentices, in the promotion of education; in fact to give opportunities for the future chemist and druggist to acquire a knowledge of his craft. No examining corporation with which he was acquainted had done anything of this kind. Those who had gone through the portal of examination actually taxed themselves year by year, and some of those he saw around him had been subscribing for forty years to the Society with the object, not of making it a trades-union, or a rich and exclusive corporation, but to enable it to give facilities to those who would otherwise have a difficulty in gaining educational training, and consequently their living. That was the object of the Bill now before Parliament, and he hoped Parliament would see that the Society was doing the right thing and would approve of it. As he saw in the room several gentlemen who were anxious to place their services at the disposal of the members on the Council he would say on behalf of that Council that connected as he was with more than one body somewhat analogous, some scientific and some of other kinds, he knew of none in which there was so much self-denial practised by every individual member of the Council. It was no light thing to ask fourteen or fifteen gentlemen from the country to come to London once a month, and sometimes twice, to attend to the business of the Society; to leave their businesses and to devote themselves heart and soul to advancing the welfare of the body politic. These men all deserved the thanks and appreciation of their fellow members, and knowing more of the matter than anyone not in office could know he begged to thank them, and to say that he appreciated from the bottom of his heart the exertions they made for the common welfare.

During the evening a selection of vocal music was given by Messrs. Winn, Coates and Schartan, and Master Kenningham, and was much appreciated.

DINNER IN AID OF THE BENEVOLENT FUND.

The following Donations and Annual Subscriptions have been received or promised. Further contributions are solicited, and should be made payable to

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17, *Bloomsbury Square, London, W.C.*

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Hodgkinson, G. A., 254, Goswell Road, E.C.	0	10	6	..		
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Hogg, Mary, Bideford..	0	5	0	..		
Holding, John, 169, Hemingford Road, N. ..	0	10	6	..		
Holmes, E. M., 17, Bloomsbury Square, W.C.	2	2	0	..		
Hopkin, W. K., 16, Cross Street, Hatton Garden, E.C.	10	10	0	..		
Hovenden and Sons, R., 31, Berners Street, W.	10	10	0	..		
Howell, Maurice, 61, High St., Peckham, S.E.	1	1	0	..		
Howie, W. L., Cornbrook House, Eccles ..	5	5	0	..		
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Ive, William, 115, Gloucester Road, South Kensington..	5	5	0	..		
Jackson, George, 870, Rochdale Road, Manchester	1	1	0	..		
Jones, W. Harris, 4, Maclise Road, W.	0	10	6	..		
Jones, W. Hy., 406, Caledonian Road, N. ..	0	10	6	..		
Kay, Samuel, Lower Hillgate, Stockport ..	5	5	0	1	1	0
Kay, Thomas, Lower Hillgate, Stockport ..	5	5	0	1	1	0
Kemp, D. S , 27, Coverdale Road, Shepherd's Bush	5	5	0	..		

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Martin, T. C. W., 36, Camden Square, N.W.	1	1	0			
Martindale, W., 10, New Cavendish St., W.	2	2	0			
Mason, H. D., 16, Cross Street, Hatton Garden, E.C.	0	10	6			
Mathews, J. and H. 1, Queen's Gardens, Hyde Park	5	5	0			
Maurice, James, 34, Bedford Street, Plymouth	1	1	0			
Mee, George, 79, Grosvenor Rd., Highbury, N.	2	2	0			
Millhouse, H. H., 54, Piccadilly, W.	1	1	0			
Moody, Stephen W., 6, Walkergate, Louth				1	1	0
Morson and Son, Southampton Row, W.C.	10	10	0			
Moule, Wm., Redditch	1	1	0			
Mousley, Wm., Redditch	1	1	0			
Mumbray, R. G., Richmond, Surrey	1	1	0			
Mumby, Col. Chas., Spring Gardens, Gosport	10	10	0			
Mundy, Alfred O., 11, Norton Folgate, E.				1	1	0
Mutch, J. P., 359, Hornsey Road, N.	0	5	0			
Naylor, W. A. H., 5, Coleman Street, E.C.	2	2	0			
Negus, Samuel, 6, Leicester Terrace, Northampton	0	10	0			
Nesbit, J, 162, High Street, Portobello	5	5	0			
Newbery and Sons, F., 1, King Edward St., Newgate Street, E.C.	10	10	0			
North, Walter D., 180, Upper Kennington Lane, S.E.	0	10	6			
Paffard, Frank, Blackburn	0	10	0			
Parkinson and Son, Southampton Row, W.C.	5	5	0			
Passmore, F. R., 17, Bloomsbury Sq., W.C.	2	2	0			
Paul, Dr B. H., 1, Victoria Street, S.W.	2	2	0			
Petrie, J. J., Aboyne				0	5	0
Pettinger, Elmer, 49, High St., Hampstead, N.W.	0	5	0			
Phillips, A. J., 180, New Bond Street, W.	1	1	0			
Plaister, W. J., 13, Gledhow Terrace, South Kensington	1	1	0			
Powell, T. H., 116, Denmark Hill, S.E.	0	5	0			
Prichard, Edward, 10, Vigo Street, W.	2	2	0			
Quain, Dr. Richard, 67, Harley Street, W.	10	10	0			
Quick, W. T., Lympstone, Devon	0	10	6			
Quincey, R. de Q., 143, Fenchurch St., E.C.	4	4	0			
Randall, W. B., Southampton	5	5	0			
Ransom, F., Fairfield, Hitchin	2	2	0			
Ransom, Wm., Hitchin	5	5	0			
Reboul, A. P., 69, Liverpool Rd., Islington, N.	1	1	0			
Redwood, Professor, Shern House, Walthamstow	5	5	0			
Rees, D., Ystrad-Rhondda	0	10	6			
Rees, R. W., 10, Vigo Street, W.	1	1	0			
Reville, H. A., Ealing	0	10	0			
Richards, Edwin, 16, Cross Street, Hatton Garden, E.C.	0	10	6	0	10	6
Richardson, John and Co., Friar Lane, Leicester	10	10	0			
Richardson, W. I., 5, Great Queen St., W.C.	5	5	0			
Robbins, J., 147, Oxford Street, W.	10	10	0			
Robertson, George, London Hospital, E.	1	1	0			
Robinson, R. A., 195, Brompton Road, S.W.	5	5	0			
Robinson, Whiteley, Haworth, Yorks	0	10	0			
Roper, Henry E., Oundle				0	5	0
Sadler, Wm., jun., 115, Stoke Newington, Road, N.	1	1	0			
Sandell, Thos. O., Baron's Court Road, West Kensington, W.	3	3	0			
Sandford, Geo. W., 47, Piccadilly, W.	5	5	0			
Sainsbury, S., 176, Strand, W.C.	0	10	6	0	10	6
Sanger, C., 489, Oxford Street, W.	1	1	0			
Saul, John E., 143, New Bond Street, W.	1	1	0			
Saunders and Son, 81, Cannon Street, E.C.	5	5	0			
Savage, W. D., 23, Freshfield Road, Brighton	1	1	0			
Savory and Moore, 143, New Bond St., W.	52	10	0			
Schacht, G. F., 52, Royal York Crescent, Clifton, Bristol	1	1	0			
Sharp, Benjamin, Brook Villa, Bathcaston, Bath				2	2	0
Shenstone, J. C., 13, High Street, Colchester	0	10	6			
Shepherd, J. W., Settle	2	0	0			
Shillock, A., Addiscombe	0	5	0			
Silverlock, H. T. and W. B., 92, Blackfriars Road, S.E.	5	5	0			
Simpson, Henry D., 2, New Street, Louth	1	1	0			
Slater, John, Castle Street, Beaumaris	1	1	0			
Smith and Co., 132, Borough, S.E.	5	5	0			
Smith, J., High Street, Clay Cross	0	10	0			
Smith, John H., 227, Commercial Road, E.				0	10	6
Smith, Robt. G., 5, Earle Road, Liverpool	0	5	0			
Snow, G. F., 7, Pall Mall East, W.	0	5	0			
Soole, J. H., 48, Compton Street, W.C.				0	5	6
Spalding and Hodge, 101, Drury Lane, W.C.	5	5	0			
Spokes, Sir Peter, 25, Chester Terrace, Regent's Park, N.W.	5	5	0			
Spurling, W. E., 187, Marlboro' Road, Chelsea	0	10	0			
Spyer, Newton, 1, Lancaster Gate, W.	1	1	0			
Squire and Sons, 413, Oxford Street, W.	26	5	0			
Stamp, E. B., 29, High Street, Hampstead	2	2	0			
Stanton, H. S., Dacre Hill, Rock Ferry	0	5	0			
Stephenson, G. R., 55, St. James's St., W.	0	5	0			
Stephenson, J. B., 48, Frederick St., Edinburgh				0	10	6
Stickland, W. H., 23, Cromwell Place, South Kensington, S.W.	1	1	0			
Stone, Fred W., Exeter	1	1	0			
Stooke, A., 2, King Street, Milton next Sittingbourne	1	1	0			
Storey, Wm., 43, Church Street, Seaham Harbour				0	5	0
Strother, C. J. (*Collected by, in small amounts*), Raglan House, Kennington Park	13	13	0			
Stuart, J. E., 180, New Bond Street, W.	5	5	0			
Swingburn, R. H., South Molton	1	1	0			
Symes and Co., 14, Hardman St., Liverpool	5	5	0			
Symons, W. H., 130, Fellowes Road, South Hampstead, N.W.	2	2	0			
Tanner, A. E., High Cross, Tottenham, N.	2	2	0			
Taylor, Fredk. J., Lovat Bank, Newport Pagnell	5	5	0			
Taylor, Geo. S., 13, Queen's Terrace, St. John's Wood, N.W.	2	2	0			
Thomas, H. A., 78, Gracechurch Street, E.C.	2	2	0			
Thompson, H. A. and Son, 22, Worship St., E.C.	5	5	0			
Thompson, John, 11, Aldersgate Street, E.C.	5	5	0			
Thresh, Dr. J. C., The Willows, Buxton	2	2	0			
Trist, Richard, Pinner	0	10	6			
Truman, H. V., 187, Newington Butts, S.E.				0	5	0
Tuchmann, Dr. M., 113, Fellowes Road, Hampstead, N.W.	1	1	0			
Turner, Charles E., 20, Bury St., Gt. Russell St., W.C.	2	2	0			
Turner, Charlton, East Finchley	0	5	0			
Urwick, W. W., 60, St. George's Road, S.W.	1	1	0			
Vialls, J. B., 56, Stanhope Street, W.C.	1	1	0			
Wade, T. T., 37, Grosvenor Road, Bristol	0	2	6			
Walker, Henry, 44, Bernard Street, W.C.	1	1	0			
Walker, J. C., 74, Turnpike Lane, Hornsey	0	5	0			
Warren, William, 24, Russell Street, Covent Garden	1	1	0			
Welch, S. C., 4, Jewry Street, E.C.	1	1	0			
West, Charles, 19, Finsbury Square, E.C.	1	1	0			
Whittaker, John W., Oldham Rd., Rochdale				0	2	
Wigg, Henry, J., 225, Oxford Street, W.	5	5	0			
Wilkins, H., St. James's Vestry, Piccadilly	0	10	6			
Williams, C., Pembroke Dock	1	1	0			
Williams, John, 16 Cross Street, Hatton Garden, E.C.	21	0	0			
Wilson and Son, Harrowgate				1	1	0
Wilson, C. F., 25, Liverpool Road, Stoke-on-Trent				0	5	
Wilson, James, 53, Hatton Garden, E.C.	1	1	0			
Wodderspoon and Co., 7, Serle Street, Lincoln's Inn	1	1	0			
Wood, C. H., 46, Loraine Road, N.	2	2	0			
Woolley, Hermann, 69, Market Street, Manchester	5	5	0			
Worfolk, G. W., Ilkley	1	1	0			
Wright, Alfred, 8, Bentinck Crescent, Elswick Road, Newcastle-on Tyne	0	10	6			
Wright, Layman and Umney, 50, Southwark Street, S.E.	10	10	0			
Wyman and Westwood, 25, Charles Street, Farringdon Road, E.C.	5	5	0			
Yates, Robert, 64, Park Street, Southwark				1	1	0
Yewdall, Edwin, 56, Wade Lane, Leeds	0	10	6			
Young, R. F., Station Road, New Barnet	1	1	0			

The Pharmaceutical Journal.

SATURDAY, MAY 21, 1887.

THE ANNUAL MEETING.

THE official record of the proceedings at the Annual Meeting, which appears in the Journal this week, is so full that there is little occasion for doing more in the present number than direct attention to it as being in many respects deserving of careful perusal by those members and associates of the Society who were unable to be present at the meeting. Some of the subjects dealt with are of especial interest at the present time, notably that introduced by Mr. FURNESS, which has an important bearing upon the future of the Society. In the address delivered by the President there will be found matter that may be usefully considered by many of those who are in the habit of declaiming against the Society in some instances for what is done by its executive, and in others for the non-performance of something they deem desirable or possible. They will, we think, have the opportunity of recognizing an unequivocal declaration of the readiness on the part of the Society's executive to take an active and representative part on behalf of its members and the pharmaceutical community generally that needs only the active support of the body and the manifestation of practical interest on the part of its individual members to be made effective for their benefit so far as that is practicable. It suggests the lesson that the action of an executive, such as the Council is, can only be the exponent of the conditions obtaining in the body represented, and that in the absence of union, unanimity and loyalty among the members of that body effective representative action for the general good cannot be hoped for. It may be hoped that this useful lesson may have some effect in promoting the establishment of a solidarity in the pharmaceutical body that is still much needed, and if that be the case, the efforts of the Council and the President of the Society may in future meet with greater success and greater appreciation than they have yet done.

THE BENEVOLENT FUND.

THE dinner held in aid of the Pharmaceutical Society's Benevolent Fund last Tuesday at the Freemasons' Tavern was very satisfactorily supported by a large attendance, chiefly of members and associates of the Society, from all parts of the kingdom. Though the absence on this occasion of guests representing the learned societies and other bodies deprived the dinner of one great feature of attraction, the hearty interest manifested in the special object of the gathering showed that this part of the work which has been done by the Pharmaceutical Society for the benefit of the body it represents is thoroughly well appreciated by a large section of that body. The chair was taken by Mr. CARTEIGHE, the President of the Society, and after the usual loyal toasts had been drunk he proceeded, in proposing the toast of the evening, to enumerate the various steps of progress which have marked the action of the Society in promoting the provision of a fund for the relief of distressed members of the pharmaceutical community. In the first place he directed attention to the fact that though the Benevolent Fund was originated by the Pharmaceutical Society as one of the great objects contemplated in its charter of incorporation, and its administration is still conducted by the Council of the Society, participation in its benefits in cases of necessity is no longer confined to those who are members or associates, but that since the passing of the Pharmacy Act of 1868, the provision for the relief of distress which the Fund affords has been extended so as to be available for all members of the craft who are on the Register of Chemists and Druggists, as well as for their widows and children. This liberal extension of the scope of the Fund, which is to a very large degree the result of the efforts for which chemists are druggists are indebted to Mr. G. W. SANDFORD, is a standing testimony to the desire to benefit the trade at large which has throughout the whole history of the Society characterized its executive. That circumstance alone should be regarded as sufficient to silence the not unfrequent, but unjust, complaint that the Society has done nothing for the benefit of the trade generally, and as regards the Benevolent Fund, it should be accepted as establishing an undeniable claim on every individual member of the trade for some measure of support as a subscriber to it.

The principle upon which the Benevolent Fund is administered is another reason for urging upon chemists and druggists its claim for support from them. The reliance upon annual subscriptions for the means of meeting calls upon the Fund, which the President pointed out to be the policy by which the Council is guided, necessarily imposes upon the trade at large the duty of contributing to it, and if from this point of view it be inquired what the trade does for itself in promotion of the efforts of the Society, it will be seen that the assistance thus rendered is but very limited. There is, therefore, ample ground for the appeal made by the President for additional subscribers, in short for everyone connected with the trade to contribute a small sum annually, so that it might be said the work of the Benevolent Fund was being supported by the whole trade for the common good of all belonging to it. Such support would be an ample justification of the Council's resolve to back the subscriptions against the invested capital in regard to the possibility of dealing effectually with the numerous applications for relief that are constantly coming before it. It was with no sense of dissatisfaction with what has already been done that this appeal was made. The

liberality of subscribers and donors to the Fund hitherto has been beyond question, and its future continuance within such limits may be trusted to; but to enlarge the beneficial influence of the Fund, and to complete the catholic character which has been aimed at, it is essential that there should be a very much larger number of small subscribers spread over the whole country. That this is the case is evident from the fact that the revenue of the Fund is not at the present time sufficient to admit of all the applicants for relief being granted annuities. It is evident, also, from the fact that there is room for doubting whether the sums now paid in this way are adequate for the purpose contemplated. Thirty pounds a year is but a small amount, and in many instances if it could be increased to fifty pounds much greater service would be rendered; but it is only by means of considerable addition to the number of subscribers that there can be any hope of either increasing the amount of the annuities or the number of annuitants.

It may, we hope, be expected that the forcible manner in which the claims of the Benevolent Fund to support from chemists and druggists generally have been urged on the occasion of this dinner will have the result of obtaining a hitherto unprecedented accession to the number of subscribers. The amount collected on that occasion, though constituting a substantial addition to the resources of the Fund, must, in accordance with the provisions obtaining in regard to donations, be invested, and only the interest upon it will be available for the purpose of paying annuities. It has indeed fallen short of the amounts contributed at the previous decennial festivals; but considering the depressed state of business, and the numerous other demands that have had to be met within a recent period, it is matter for congratulation, we think, that so much as eleven hundred pounds should have been contributed in the shape of donations and new annual subscriptions. But apart from the immediate result of this Festival in augmenting the resources of the Fund, it may be anticipated that the opportunity offered for giving greater publicity to the character of this section of the Society's work, and to the reasons for its being favourably regarded, may have the effect of inducing many who have not hitherto given it the attention that it merits to consider the case, and to come to the conclusion of rendering their assistance in the future.

THE REDWOOD TESTIMONIAL.

After the termination of the Annual Meeting of the Society a large number of the subscribers to the Redwood Testimonial Fund assembled, in accordance with a notice that had been given, for the purpose of taking part in the concluding formal ceremony of handing over to the Society a portrait of Emeritus-Professor Redwood, which the Committee has had painted by Mr. Sydney Hodges to be placed on the walls of the Society's premises. The chair was taken by the President, who briefly stated the object of the meeting, and called upon Dr. Garrod, as a member of the Executive Committee, to be kind enough to present the portrait to the Society on behalf of the subscribers of the Fund. In the course of his address Dr. Garrod mentioned the circumstances under which the Testimonial had been originated, and the mode in which it had been carried out by the foundation of a scholarship in commemoration of the great services that have been rendered by Professor Redwood during a long series of years in the advancement of the objects of the Pharmaceutical Society and the promotion of education. After alluding to some of the more conspicuous instances of Professor Redwood's active labours as an officer of the Society, and in official connection with the Chemical and Cavendish Societies, as well as in other capacities, he spoke in warm terms of admiration of the important personal influence exercised by the Professor, which an acquaintance of nearly forty-five years had given him the opportunity of observing, referring especially to the character and style of his lectures delivered at Bloomsbury Square. The portrait was then formally presented, and the President in receiving it on behalf of the Society expressed his satisfaction at being its recipient, besides congratulating the Society at this new addition to its gallery of worthies which would take a place in company with the portraits of the Professor's good friends, Jacob Bell, T. H. Hills, and G. W. Sandford. A further proceeding of the meeting was to request Professor Redwood's acceptance of a replica of the portrait that is being prepared. In reply, Professor Redwood expressed his deep sense of the honour that had been conferred upon him and of his gratitude to the originators and promoters of the undertaking which had been carried out with such judicious regard to his own feelings. In conclusion he said that feeling he had still strength and health for the performance of much work, he hoped to be able to devote such energies as he retained in the furtherance of the cause to which he had been so long devoted. The Professor's speech was received with enthusiastic applause, and after a vote of thanks had been passed to Dr. Garrod, and acknowledged by him, the proceedings were terminated.

THE CONVERSAZIONE.

The Conversazione held at the South Kensington Museum on Wednesday evening did not in any respect fall short of the success that has hitherto marked this annual gathering. The number of visitors on this occasion was 2796. The reception by the President and Mrs. Carteighe, the Vice President and Miss Gostling, the Treasurer and other members of the Council, several of whom were accompanied by ladies, commenced shortly after eight o'clock, and the halls and galleries of the Museum were soon filled with guests. During the evening an excellent selection of music was performed by the band of the Royal Horse Guards Blue in the principal court, under the direction of Mr. Charles Godfrey, and in one of the theatres attached to the Museum a succession of numerous audiences were entertained by Mr. Winn's glee party. The whole entertainment passed off most agreeably, forming a pleasant supplement to the more serious work of the day at the Annual Meeting.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, May 18, 1887.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

MR. T. P. GOSTLING, VICE-PRESIDENT.

Present—

Messrs. Allen, Atkins, Baildon, Bottle, Butt, Cross, Greenish, Hampson, Hills, Radley, Richardson, Robbins, Savage, Schacht, Southall, Symes and Williams.

The Council arranged the order of business at the Annual Meeting, to which it then adjourned, after restoring several persons to their former status in the Society.

FORTY-SIXTH ANNUAL GENERAL MEETING.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The forty-sixth Annual Meeting of the Pharmaceutical Society was held at the Society's house, Bloomsbury Square, on Wednesday, the 18th inst. Mr. Michael Carteighe, President, in the chair.

The Secretary read the notice convening the meeting. The report, which had already been published, was taken as read.

The PRESIDENT, in moving the adoption of the report and financial statement, said he should probably consult the convenience of the members if he did not go into much detail with regard to the ordinary routine work of the Council, much of which was of a character well understood, but which could not very well be recorded. The financial statement also spoke for itself, and there was nothing he need call special attention to. The first part to which he need allude was that which referred to the Pharmacy Act Amendment Bill, and which stated the position in which the Bill stood when the report was issued. Since then the Bill had been postponed by consent until after Whitsuntide, so that substantially it remained as was stated. This Bill was the outcome of a series of discussions which had taken place in that hall and at the Council table with regard to the best way of training candidates for examination. They knew that a large number of candidates were plucked, which, of course, caused great irritation ; but he feared that would always remain so. He never knew an examining body which was beloved by those who had to pass through the examination, and, of course, that feeling was not to be expected on the part of those who were rejected. On the ground of expediency, therefore it would seem desirable to propitiate the rejected candidates and give them an opportunity of succeeding if possible at the first attempt. Much had been said about the possibility of doing this, that, and the other by examination, but all would agree that examinations were necessary evils. Their forefathers did not employ examinations ; they put a man through a course of training, a long course, watched the work he did, and if it was satisfactory admitted him to the craft. In later days, all over Europe especially, there had been an attempt to undo that sort of thing; it was thought that seven, or even five or six years' apprenticeship was too long, that any intelligent lad could learn certain things much more quickly in these times than he could before. He believed their forefathers and the ancient Greeks and Romans were right, and that the best test of a man's qualification was what he could do in a series of years, not what could be got out of him in an hour, or three hours in an examination. He spoke feelingly, having done as much mischief in this way as any member of the Society ; but having been appointed an examiner he had had to carry on the examination according to the regulations which prevailed. The most painful portion of an examiner's task was that of listening to the plaintive remarks of the rejected candidates. Those remarks did not generally apply to the examiners, the complaint was more of this kind:—"If I had known in early days what I should have to do I could have prepared for it, and could have passed, but until I was twenty-one I did not even know there was a Preliminary examination to pass." It was sometimes the fact that a youth came into the trade, and until he was twenty-one he was not told that he would have to pass a Preliminary examination as well as a qualifying one. What was to be expected from those poor fellows ? He had had to reject hundreds of them; but while he rejected them with firmness and decision he sympathized with them, and would be the first to put his hand into his pocket to assist them to get the necessary knowledge and training. They could not be sentimental with regard to examinations ; these must be carried on in a practical way, and unless one could adopt the expedient which the Chinese did of examining a man for three months, they could never be quite certain that he was competent. That was too expensive a process for the chemist and druggist, therefore they asked the members to approve the principle that every person who came into the craft at an early age should know what he had to do before he could be registered and qualified to earn his living, and, secondly, that he should have the way pointed out to him by which, with ordinary care and diligence, he might obtain the necessary knowledge tacked on to the practical knowledge he obtained in the shop for the purpose of satisfying the examiners. The most striking thing with regard to the draft Bill now in the House was the remarks of members of Parliament with regard to what was being done for the trade, who did not all seem to appreciate these efforts. They were not long-sighted enough to see that what was good for the public and for the individual with regard to education must in the long run be good for the trade. What astonished members of Parliament was that those who were looked down upon by some people as ordinary tradesmen were putting their hands in their pockets every year and spending money to promote education, and to put young men in the way of passing an examination to come into the very craft of which they were members. It was astonishing to them to find that those on the Register were so generous as to subscribe a handsome sum annually for this purpose, and that went a great way towards enlisting sympathy for any proposal which came from the Society. They had heard of examining corporations, but he knew of none in the kingdom by which a systematic expenditure was carried on for this purpose except the Pharmaceutical Society. It was to the credit of the founders and the present members and associates that they were willing to continue to subscribe to force on the means whereby other persons had become qualified to practise pharmacy. The Bill now introduced was the outcome of the approval which members had given from time to time to this subject. It had been held desirable that some evidence of having acquired knowledge should be presented, and as the powers they at present possessed were not sufficient they went to Parliament and asked for these powers, feeling confident that the Society would continue in the future as it had in the past, desirous of affording facilities for education throughout the whole of the kingdom. That had been the policy of the Society and would continue to be so. It would be perhaps right to refer to one objection which might be taken to the Bill, that it did not cover enough, and there was also another objection which might be taken by some members, and was taken by some outside. The first objection, was, What was the use of going in for small reforms ; why did they not take up something else, remodel the constitution, abolish the awkward grades of membership, associateship, and all that sort of thing? The answer to that was

plain. He would assume that they had all read the report of what took place when the Bill was approved in the Council, and it would be remembered that every member who made observations expressed the desirability of going to Parliament for several things; it was simply a question of tactics, how best to deal with the one subject which at present was most important, namely, that of education, on which, at all events inside the Society they were supposed to be agreed. If they had gone with this Bill feeling that the members generally were antagonistic it would have been hopeless, and he ventured to think that the members had expressed their decided opinion that considering the difficult task which every principal had to perform with regard to his apprentice or pupil it was unreasonable to expect him to teach him such an amount of elementary chemistry, botany and *materia medica* that was necessary to pass the examination. Parents and guardians would not pay for that sort of teaching, and therefore the tendency of the time was now for apprentices and pupils to be taken into a pharmacy, the arrangement being that the principal did not undertake to teach them anything more than they could learn in the ordinary course of business. In old days a principal would take an apprentice into his house. He was supposed to be educating him from morning to night, and almost in the night, and he was to take care of his morals after the day's work was over, and especially on Sunday. That was perhaps one of the best forms of training, if principals would undertake the work, but he confessed he had never had the courage to undertake it, though he respected those founders of the Society, men like Henry Deane and others, who used to do so. The fact was that no amount of money recompense would repay an intellectual man for giving so much time to his pupil, and, therefore, the present system was likely to continue, by which the apprentice was allowed to run through the ordinary course of work in the shop or laboratory, whilst he had to get his scientific education in the lecture or class room. The principal might say, "I will give you every facility for learning, but I will not undertake after a hard days' work to sit down and teach you modern chemistry or botany." That was a reasonable proposition, and to meet that the present Bill was drafted. They went to Parliament for one subject only, because it was considered as a question of tactics it was more likely, in the present state of Parliamentary business, to pass. The Council was painfully conscious of a great many things which wanted remedying; probably every Prime Minister was also conscious of many things with regard to the country which wanted remedying; but the Council had to deal with things as they arose, and to attempt to introduce into Parliament any subject about which there was any material controversy amongst themselves and in the present congested state of business in the House of Commons would be useless. They believed that in this particular part of the programme they were substantially correct, and if any opposition arose it would be on account of misapprehension rather than anything else. To the other class of objectors who said that this would increase the difficulty of getting on the Register, he simply traversed the statement and said it was just the contrary. It was assumed that a man going into an obscure Scottish village was so brilliant that he could come up and pass an examination without any help from outside. If he could, so much the better, but as a matter of fact, did experience either of the Scotch or English Board of Examiners show that this was the case? All who had held the office of President or Vice-President of the Society would agree that it was very rare for a man in these days to pass the qualifying examination without having obtained professional assistance in one or other or all of the branches of the examination. The majority of men having to work during their apprenticeship, and not being simply students, had to get the necessary knowledge somewhere to pass the examination. As a rule their previous history and training were not sufficient to enable them to do it without the assistance of a teacher of some kind, and not knowing any better many of them went to what he considered irregular instead of regular teachers. They neglected the opportunities given during apprenticeship, waited until it was over, and then thought they could go to some place in London where everything was made easy, and in three months be prepared to pass. He ventured to think that inasmuch as the law required that every person should pass an examination in the subjects embraced in the Bill, namely, chemistry, botany and materia medica, which covered ground that in ninety-nine cases out of one hundred could not be covered without assistance other than that obtained from the master, the candidate was now driven outside for his education in the scientific portion, and therefore the result of the Bill would be to facilitate persons getting on the Register rather than to place difficulties in their way. An objection has been raised in Glasgow and the West of Scotland with regard to the difficulty about apprentices. It was said that the arrangements there for getting medical qualification were very easy—that a man in connection with the College of Physicians of Glasgow, and to a certain extent in the University of Glasgow, where he could take certain subjects in turn, might after a course of seven or eight years' persistent work eventually become qualified as a medical man—and their friends in the West of Scotland had always said that if a compulsory course of study were required it would be difficult to get men to come into the craft. The answer to that was that where there were such facilities as were known to exist in Glasgow and all Scotch towns for obtaining an excellent education at a nominal cost, there could not be any difficulty in the way of getting men on the Register. If the difficulty was that men wished to take apprentices without telling them frankly and fairly what they would have to do before they were qualified to enter the trade and earn their own living no doubt it would be a little inconvenient to have any legislation of this sort, but if the master intended to act conscientiously towards a lad whom he was taking as an apprentice he ought to assist rather than obstruct the passing of this Bill. He would not say much about the Early Closing Bill, as it would only be repeating what had been said by himself and others before, that many would hail with acclamation a bill that shut up every chemist's shop at eight o'clock every evening. But even Sir John Lubbock was not able to promise that. He told them that though the shop was shut up, the side door would be open for emergency cases. Now, in the present day there were practically no side doors in large towns. There was only one door into the pharmacy, and that was the front door, and he submitted to men of practical common sense that any Act of this sort would be practically useless for the purpose contemplated. If it were possible to carry out the Act in its integrity, the only way would be to make it compulsory to shut up completely. But that the public would not submit to, and therefore in the case of chemists and druggists the exception was needed. It was said you were not obliged to keep the shop open, but in many cases, having regard to the enormous rent, a man had not even a back room to sit in; he or his assistant must be in the shop and must be at the service of the public, and he was, therefore, practically upon duty and his shop open. Further than that, his view with regard to this Bill was that there was an attempt being made to compel a certain number of people who were found in every occupation who objected to be bound by hard and fast lines. If there were a large number who objected to the spirit of the Act, and it were passed against that feeling, there would be in the suburbs of all large towns all sorts of attempts to evade the Act, even if it were carried out elsewhere, and

practically the shops would be kept open although the statutory closing hour was eight o'clock. Under these circumstances he hoped the promoters of the measures would think proper to exempt chemists and druggists from its operation. But he took higher ground even than that. He sympathized with the idea that every man of the craft or apprentice should be relieved from labour at an early hour. He sympathized also more strongly with the proposition that whether they were called traders or not, they were altogether different from the butcher or baker. They had duties to perform to the public, and, like the medical man, were bound to be at the call of the community and they must recognize that as a condition of their existence. These could not be got rid of by legislation any more than you could stop the flow of a stream. He thought he might reserve anything he had to say with regard to the other portions of the report until afterwards, if necessary, but with regard to the Honorary Members, he might mention that there were a number of distinguished men recently elected and that was due to the fact that for some few years the Council had been contemplating a little change in the Bye-law with regard to this matter, and pending those changes elections had not taken place. By the present Bye-laws Honorary Members could only be elected once a year, and at a result of passing them over for two or three years there had been twelve vacancies created, and those were filled up at the last Council meeting. He hoped the Society would see its way before long to establish not only a list of Honorary, but of Corresponding Members. That class usually consisted of men younger than the Honorary Members, such as were spread all over the world doing work in the particular direction in which the Society was working. There were all over Europe, and to a certain extent in India and in the United States, a number of men whom he would like to see associated with the Society as corresponding members, who would not only do the Society honour, but would be extremely useful in advancing pharmacological knowledge, and he hoped that before another year it would be possible to elect a number of these men on the roll of Corresponding Members.

The VICE-PRESIDENT seconded the motion.

Mr. LONG cordially supported the scheme of the curriculum because it was that which nearly all the early members of the Society went through in a voluntary manner in the same way as they underwent the voluntary qualifying examination. With regard to apprentices, he thought that if a man were qualified for his business and took a pleasure in it, and, instead of throwing his books on one side after he passed his examination, kept up his studies and took an interest in his apprentices and assistants, he would be very much better prepared to take advantage of the curriculum. He would advise all those who took apprentices to see that they attended lectures as early as possible, which would be greatly to the benefit both of the pupil and the master. Unfortunately, it was not always the principals, but the youths themselves who were at fault. With regard to early closing he had shut up early for twenty years, but it was impossible to do so now, because his neighbours would not do it. He should like to see a general closing hour for all chemists, just the same as bankers. They did not find a bank in a poor neighbourhood keep open longer than a bank in a richer one. When the public knew they could get anything at any time the result was that it threw all the business of the day into the evening. In the suburbs all the business was done in the evening, just when the chemist had to let his assistant out, or when he wanted to get out himself. He gave the Council credit for its sagacity in extending the premises, but he hoped they had not forgotten that all improvements did not go to the improver, but were a sort of "unearned increment." He hoped that had been taken into consideration. At the present time the Society's rules and teachings were not valued by those for whose benefit they were intended, and if the chemists themselves did not come up, they might be induced to do so by modifying the fees in some way instead of throwing the Society open to the public. Directly the Pharmacy Act passed the Society ought to have become a branch of the Government—as it was in one sense—for regulating pharmacy matters, and he thought the Council neglected its duty in respect to one of the three objects for which it was founded, namely, the protection of its members. He admitted that it had attended to the other two, namely, to benevolence and to education. In the latter respect he considered that it had been of the greatest benefit to himself, for if he had been an ignorant jackass, the many hours of leisure which he was forced to spend would have been irksome, but owing to the education he had received he had resources in himself. Still he thought the Society should devise something with regard to the protection of the members as a trade body.

Mr. ROBINSON said he had one or two questions to ask on the financial statement. He saw the postage of the Journal came to considerably more than it would amount to at a ½*d.* a copy to the members and associates. He presumed a considerable proportion was for foreign postage.

The PRESIDENT said that was the case to a considerable extent.

Mr. ROBINSON said he had listened with great attention to the President's remarks and had nothing to say against them, but there was something further he should like to hear, and if the Council could see its way to carry out the objects of the Charter entirely it would be a great advantage. No one would accuse them of neglecting the Benevolent Fund, and they all knew the Council was very careful with regard to the first object of the Charter, namely the promotion of chemistry and pharmacy; and also the second, the promotion of a uniform system of education; but there was another line which said the Society was also to protect the interests of its members. He did not say it had neglected that altogether, but it would be very satisfactory to hear that it intended to protect the interests of the members wherever it could do so without lowering the dignity of a great Society. Of course he did not wish to do anything which would injure that dignity, but an old clergyman from whom he used to receive instruction told him that a dignity which required to be continually trotted out was not worth very much. It seemed to him that the Society might give encouragement to men in the country who at present thought it neglected their interests, and that it would be right in case a man was unjustly attacked, as they were sometimes, to assist him. He did not say it had never done so, because he knew it had; for he had read how, many years ago, when a man named Betts set up an exclusive right to the use of capsules of his manufacture for bottles, and thirty or forty chemists were threatened with prosecution, they united together, and by the help of the Society and its officers and Solicitor—they also subscribing some money themselves—put a stop to those proceedings. It seemed to him that if the Society were willing when thirty or forty members were attacked unjustly to defend them, it might also be willing to take each individual case, and to give support to anyone in such a difficulty. He also remembered an occasion in which the Inland Revenue Department contended that the label, "Rubini's Spirit of Camphor" was liable to stamp duty, and there again the Society stepped in and resisted the claim. Of course, where a man had clearly broken the law he did not want the Society to defend him, but the argument he had to meet was this: It was said, "You might drive the Society into collision either with the Legislature or with the public, and it might be that they were trying to set up some exclusive right against the public interest." He did not want anything of that sort. Anyone who acted illegally must take the consequences of doing so; but there was an

opening, he thought, more especially when another association established purely for trade purposes was not in a very healthy condition, for the Society to step in and gain the goodwill and the guineas of many men in the country who did not at present subscribe. He had always tried to impress upon these men the necessity of joining the Society, and told them that if they kept aloof they had not the chance of altering its constitution ; whereas if they would come forward and join it they would be enabled to influence its policy, and to elect those men on the Council who would carry it out. One matter he had brought forward last year, but as the Council promised to consider it, he did not wish to refer to it again, except to say that, although the gentlemen on the Council unanimously agreed that nothing could be done, he believed the majority of them were in favour of some alteration being made. He referred, of course, to an improvement in the Journal ; and he was waiting to see on what lines the alteration could be made. There was a considerable expression of opinion on that point, and he had had many more communications on the subject than he expected, showing that there was a large and growing opinion that some change was desirable. Therefore, although it was agreed that nothing could be done specially at that meeting, he hoped the matter would not be lost sight of.

Mr. HOWARD HALL said he noticed from the first paragraph of the report the statement that the financial posi- of the Society was very satisfactory. He had taken a little trouble to go into the items of the account, and he found the net receipts for the last year were £316 10*s.* 8*d.* more than the year previous. As a set off against that there was a falling off in the subscriptions to the amount of £87 8*s.* 6*d.* which, he took it, represented a loss of seventy subscribers. With regard to the entrance fees, which was an important item, there was an increase of £273 5*s.*, and also on registration fees, of £23 2*s.* Then with regard to the Journal, to which he had called attention before, he thought it ought to be made a source of profit to the Society and not a loss. This year he could not see any profit at all, whereas one year, if he remembered rightly, a profit was shown to the amount of £10. The item of paper showed an increase, but the printing showed a decrease, which was very satisfactory. The item of publisher's commission did not appear to him very satisfactory. There was a little increase in the item for contributions, which he was glad to see, because he thought the Society ought not to be in the position of accepting unpaid labour. He was also glad to see an item of £50 given to Professor Dunstan for research work, and hoped that good results would follow. Returning to the Journal, he saw that though the publisher's commission had increased there was on the other side a diminished distribution or sale of the Journal to the extent of £39 2*s.* 8*d.* Could not better arrangements be made with the publisher? It did not seem to be right that there should be an increased commission on a diminished sale.

The PRESIDENT asked if Mr. Hall would explain that point a little further.

Mr. HALL said the publisher's commission was £549, and by last year's report it was somewhat less.

The PRESIDENT said the commission was of course on the business done during the period under consideration. If he were criticising the accounts he had nothing to do with last year, but must take what appeared on the other side.

Mr. HALL said he was only taking it for the purpose of comparison with last year, and it showed a decrease of sales, and an increased publisher's commission, which he thought must be a bad system of business. Then he found on the receipt side some items which swelled up the income,—penalties and costs for infringment of the Pharmacy Act, £94 5*s.* ; but on the other side the law costs showed an increase of £138 3*s.* 9*d.*, and the question was whether the game was worth the candle. Of course he knew that the law costs included other business besides prosecutions. The next item he noticed was for the purchase and binding of books, which showed an increase of 2*s.*, and he should have been very glad if it had been more. The Museum also showed a slight increase, and that was very satisfactory because they saw the result in having a more perfect Museum. He was glad to see a decrease in the heading of office expenditure of £70, and he wished to give due credit to the Secretary not only for the efficient way in which he performed his duties generally, but also for the care he evidently took in keeping down the expenses. Then one subject—which although not referred to in the report he could not pass over—was the retirement of Professor Bentley. As an old student of the Society, he could not be present at the Annual Meeting after this had been brought to his knowledge without expressing his best thanks to Professor Bentley for the very great kindness he showed him, not only when a student of the Society, but ever since.

Mr. FLETCHER said there was a paragraph referring to the unsatisfactory number of failures in the examinations, and he wished to ask whether the London Board of Examiners had adopted a regulation by virtue of which a candidate for the Minor examination who failed in the first or any subsequent subject was prohibited proceeding further on his examination, and whether such regulation had been approved by the Council, and was in accordance with the Bye-law, section 10, clause 11 ?

The PRESIDENT said the answer was very simple. In the first place the Board of Examiners in London and in Edinburgh had adopted no such regulation, but it was their practice to act as described. Mr. Fletcher was evidently confusing the regulations which affected the candidates with the practice of the Board. By the Bye-laws the Examiners were authorized to grant or refuse to such persons as tendered themselves certificates of competent skill or qualification, and in accordance with that practice referred to the examiners granted or refused a certificate so soon as the person who had tendered himself had convinced them by failure in any one of the given subjects that they could not grant him a certificate. They then considered that he could not on that occasion claim their further attention. This course was in accordance with both the Act and the Bye-laws ; in other words, the examinations were to test competency, and not to test the degree of knowledge and experience below competency.

Mr. FLETCHER said if he were in order he should like to make a remark on that because he believed this practice was a comparatively new one.

The PRESIDENT said that was altogether a mistake ; it had been in force for years, both in London and in Edinburgh.

Mr. FLETCHER said if that were so he thought it would be only fair to candidates coming up for examination to distinctly inform them that if they did fail in one subject, although that might be the very first given them, they would be prohibited proceeding further. His attention was called to this matter a few weeks ago, because he happened to know two very well qualified young men who went up ; one went first to dispensing, and the other to pharmacy. The first candidate had a few pepsine pills to make, which he made too soft—they turned out very badly, and the examiner told him he could not proceed further. He applied to the chairman, who confirmed the examiner's statement. The same thing happened with the man in pharmacy. Now when a candidate had come perhaps from the end of the kingdom at a considerable cost, and had paid three guineas fee for the examination, it seemed a great hardship to be only allowed a quarter or half an hour on one subject. The President, in his opening remarks, had referred to examinations as necessary evils, and he did not suppose the most ardent upholder of examinations would pretend to say that they were an absolute test of the qualifications

of a candidate, least of all could a man's qualification in half a dozen different subjects by tested by half an hour's interview with one examiner, under most unfavourable conditions. If there were a well-recognized practice of the Board, endorsed by the Council, the least that could be done would be to give due notice of it.

Mr. WHITTLE desired to endorse the President's remarks as far as the curriculum went. He thought no chemist ought to take an apprentice unless he were able and willing to teach him the business; but he knew many youths were taken without being able to pass the Preliminary, and when they were twenty-one, they said they never understood what would be required of them, and that was the reason of so many failures. If the curriculum were enforced and explained to them at first it would be a saving of money to them. The previously proposed Pharmacy Bill, if supported by the whole trade, would no doubt have gone in for something very different, but they were obliged to modify the Bill on account of the modified support that was received. He should like to know how chemists outside could enhance their position without joining the Society; it was the only means by which they could help themselves. If they studied their own interests and joined the Society, so that it was backed up by the 13,000 chemists throughout the country, the Council would be able to pass a very different Bill. Young men did not so much object to the examinations, but they asked was the game worth the candle. He should like to see a larger selection on the Council, gentlemen better known coming forward, because the members were to a great extent in the dark when voting. Some few had come forward this time, but how many knew anything about them, or how they conducted their own business? He would suggest that as they had the term "P.C." for pharmaceutical chemist, they should also have the title "C.C." for cutting chemist, and that candidates for the Council should state whether they belonged to that category. He believed there was one gentleman on the Council who advertised Cockle's pills for 9*d.*, but that was not the sort of man who ought to represent the trade.

Mr. WOOTTON asked if the President could explain how the practice of the examiners which had been referred to was in accordance with the Pharmacy Act of 1868, the 6th section of which said that the examiners were required to examine all persons who tendered themselves for examination in such an examination as that described in the Act of 1852, which consisted of about six subjects.

The PRESIDENT said the regulations of the board were that a man must be competent in every subject, and if on the basis of the marks a man was found incompetent in one subject he failed to pass, and would be no nearer if he were examined in all the other five. He would still be rejected, as competency in every subject was required.

Mr. WOOTTON said he quite understood the candidate would fail in the examination; but he believed that in the cases referred to the candidates applied to be examined in the other subjects, and he very much questioned whether, according to the wording of that clause, they could not insist on going through those other subjects.

Mr. WILLIAMS thought if it was the practice to reject a candidate simply because he failed to make a batch of pepsine pills, it was a great injustice. Probably very few in the room would undertake to make one hundred batches of pepsine pills without a single failure, and if such was the case, was it not to be expected that a man coming up in the nervous condition in which they generally came, if the first thing he tried at was a batch of pepsine pills, should fail?

Mr. SANDALL was pleased to find by the report that the new building was being well advanced, and thought it would be a credit to the Society, and ought to have been undertaken long ago. He should like to know the amount of the contract.

The PRESIDENT said the plans had been slightly changed from time to time, and he could not give the exact figures, but the cost would probably be about £6000. In reply to a further question, he said the lease was for eighty years, at a ground rent of £60.

Mr. CURTIS asked whether the large number of failures referred to might be in any way due to the conduct of some of the examiners; whether those who came to be examined were not sometimes taken entirely off their legs. Personally, he had nothing to complain of in the matter; but he had heard various reports from people coming up, and having known them, and seen the manner in which they did their work, he knew as well as any examiner that they were quite capable of going behind a chemist's counter, and the question arose, Why was it they could not get through? He should like to ask whether one or two of the examiners did not act in a somewhat arbitrary fashion, and treat a person coming before them as if he were a mechanical being whom they could turn and twist about in any way. He hoped his remarks would not be misconstrued as antagonistic to any particular examiner, but there were people who had failed who he thought had not been treated quite fairly, and possibly a word of caution from the Council might be of service. He believed it was the apprenticeship which passed the examinations, though he knew there were men who took apprentices without troubling anything about them. He had known cases where premiums were taken and not a single attempt made to teach the apprentices anything. With regard to the Journal, he would suggest whether a somewhat intermediate course might not be adopted. He had had an interview with the editor and sub-editor that morning, and was informed that the Journal could not be run as a "tit bit" paper, that it would be contrary to the dignity of the Society to do anything of the sort. He quite admitted that, but still all would admit that the Journal was not read half as much as it ought to be. He thought that was because an apprentice taking it up found a lot of hard names which he could not understand, and there was nothing else put in to suit his taste. He thought there might be something put in to help the apprentices and assistants to come up to the highest standard of literature which formed the bulk of the Journal, and if that were done, the other portion would be read, and the general interest of the assistants and apprentices would be aroused. As regarded the Early Closing Bill, he was sorry the Council had in any way opposed it.

Mr. URWICK said as he was neither on the Council nor a member of the Board of Examiners, a remark from him on that subject would be appropriate. He had had several men who had been up to be examined, and who had failed, but on talking to them they had generally confessed in the end that they had no ground of complaint. He had also had men who had passed, and who had complimented the examiners all round. He should like the Society to watch the education given at one place to which a grant had been made, where there was a very good school indeed. He referred to Aberdeen, and he believed it would be found that almost everyone who had come up from that school during the last twelve or fifteen months had passed the examination, and had done so without going to any cramming schools. They had gone straight from the training obtained in Aberdeen, without any extra fees for teaching, and had many of them passed well. That seemed to show that there was a system of teaching there which might be recommended to other centres of education. It was the same thing with regard to the Preliminary examination, for out of eight candidates from Aberdeen, six passed. That must be connected with the mode of training, for he did not suppose that Aberdeen had all the brains of Scotland. It was the same thing with Lincoln, for a very small percentage who came from there failed to pass, whilst in other quarters the failures had been very numerous. He did not think it was altogether the fault

of the youths, but must be a result of defect in the teaching. It was not every man who was a good teacher; there were men who could make their subjects agreeable and pleasant, whether it was arithmetic, Latin, or Greek, and led their students on. Such a man was Dr. Pereira; there was not a man like him in London now, either in the medical profession or any other; he led the students to love their subject, and to adore their lecturer. He might also say that he had the greatest respect for Professor Bentley, who taught him what little botany he knew, and he had never heard a more fluent or competent teacher.

Mr. FURNESS said experience showed that the Annual Meeting was not very competent to deal with the report placed before it by the Council, its power being limited to either accepting or rejecting it in its entirety, and this would explain why he deferred till after the report was passed bringing forward a resolution which he should then submit; still, as criticism had been freely invited, he proposed to ask a few questions upon the report which had occurred to him. In the first place, he should like to ask which item represented the amount spent in promoting the Pharmacy Bill. He thought the amount of law costs, £404 16*s.* 8*d.*, although an increase on the legal expenditure of late years, was not at all proportionate to the income of so influential a Society. There were certain very prominent grievances which required dealing with, and for which the law had to be put into operation to remedy. On the previous night the President referred to the very satisfactory manner in which the Society had carried out one of the objects for which it existed, namely, the provision for indigent members, and he could endorse all that was then said on that subject, and also as to the manner in which it carried on the education of its members. But there was another object in the Charter; it was intended to protect those who practised the art of the chemist and druggist, and although this had been done to a certain extent, it had not been done effectively. Even the President and his colleagues, he thought, could hardly claim that they had carried out this object as fully as they should, and he hoped the Council would think over this point, and spend more money in that way. He would not enumerate the grievances under which they suffered, which had been well ventilated in that room, and in the pharmaceutical press; but he thought it was not sufficient on such a point for the Council to say *non possumus*, that they were anxious to remedy them, but that it was not expedient to do so, that the time was inopportune, and so on. The questions to which he alluded ought not to be allowed to wait, and the Council should not raise obstacles, but face them, and endeavour to remedy them. If they were unable to do so they would, at any rate, have had the satisfaction of knowing that they had discharged their duties. One little item in the accounts he should like some explanation of. It appeared that they had spent £147 on the alterations and enlargement of the stable at the Scotch premises, and that it produced a revenue of £9 19*s.* 6*d.*, which did not seem to him a very profitable investment.

The PRESIDENT said that was only half a year's rent, which made the investment somewhat better.

Mr. FURNESS said he would admit that that was good finance; better, he thought, than spending £6000 on a lease for eighty years with £60 ground rent. He would also ask to what period of the year the accounts were made up.

The PRESIDENT said the accounts were made up to the end of the year, as was indicated by the heading.

Mr. FURNESS said he asked the question because in January, 1886 a grant was made to a provincial association which did not appear in last year's report; that of course was now explained. But a grant had been made in January, 1887, which did appear in the report.

The PRESIDENT said the grant last referred to no doubt appeared in the report which did refer to matters up to the date at which it was issued, but that item did not appear in the accounts for the last year.

Mr. FURNESS said that most associations and companies with which he had to do stated in the accounts the amount which there was at the bank, but he did not see that item in this account; probably it was included in some other item. Passing from the financial statement to the report itself, he thought it was very strange that the Council should have thought fit to take the action it had with regard to the Early Closing Bill, seeing that the trade had for years and years been striving to get more uniform action in the hour of closing. He thought it a pity the Council had interfered to oppose the Bill. He was opposed to the principle involved in Sir John Lubbock's Bill, but he thought the Council might have abstained from any action which might have the effect of wrecking a Bill which might benefit the trade.

The PRESIDENT said there was no opposition to the Bill by the Society. They only proposed to exempt chemists from its action.

Mr. FURNESS, continuing, remarked that the number of cases of alleged infringement of the Pharmacy Acts were recorded at 152, whilst in 32 proceedings had been taken. That showed a very small proportion, he thought, of the illegal trading which took place, for within his own limited knowledge he could report quite as many as the cases prosecuted. He would suggest that in order to get more specific information on this point the Local Secretaries should present annual reports to the Council, which would be valuable documents statistically and otherwise, and would be useful for future reference. He might refer with great satisfaction to the second paragraph referring to the grants made to provincial associations, and commended that practice for further extension. He felt sure that if the Council would devise some well-considered scheme of systematic assistance to these provincial associations, something in the shape of annual grants, it would be of incalculable advantage. He could speak with some authority as to the conditions under which these associations existed. The higher technical education never could be self-supporting; the Society's school itself, if it were dependent on the fees of the students, would soon come to an end, and that was the difficulty they had to face in the country, and probably accounted for the early collapse of many provincial associations. He could testify to the great amount of good done to the school he had in his mind by the grant made; it had enabled the school to keep on, and it turned out some excellent men. These provincial associations were eminently deserving of pecuniary assistance, and of the advice and assistance of members of the Council. Referring to the case heard in the Court of Queen's Bench yesterday, in which it was stated in a very emphatic manner by Lord Coleridge that tincture of opium represented the article which the chemists of Sheffield had contended for, he remarked that that case had been brought forward in some measure through the action of the Sheffield Society, and showed that good work was done in other good ways besides educationally. Speaking for themselves, they were quite willing to submit to any test of competency the Council might see fit to impose, such as a capitation grant on pupils who satisfactorily passed the examination, but he would urge the Council to spend a portion of its funds in defending the interests of the trade, and another portion in trying to assist struggling and deserving provincial associations.

Mr. SMITH (Walworth) thought it would be well if the Council could take a little more account of the peculiar condition of the trade interests of the Society at the present time. He did not find any fault with it; he knew that education was a subject which had always held a very high place in the interests of those who had hitherto been upon the Council, and that it was so still, but he could not help thinking that a little more attention might from time to time be given to

trying to investigate the real interests of the harder working portion of the body. Whatever might be said about education—and they all knew what his views upon it were—the hard bread-and-cheese matter-of-fact kind of everyday life was a thing they could not escape from. They could not live, with all their education, in the present condition, especially in some neighbourhoods, with the frightful competition they had to meet with. It was so everywhere, but much more so in some places. Therefore while he did not hold the Council responsible for this result, he did respectfully suggest that it might recognize that such a thing did exist as the necessities of their humbler brethren, and do what lay in its power from time to time to give them a helping hand. He should support the curriculum unquestionably, for if the young men thoroughly understood their own interests, they would be most anxious to go through a regular curriculum. A large number of men would manage to go through, and to do almost any kind of work you put before them ; but there were also a large number who wanted to be assisted, and shown what they had to do. He had taken apprentices, and the name of an apprentice of his was on every one of those boards, but a man who took an apprentice appeared to him a man who had placed upon him the necessity of first of all studying the character of the boy. In times gone by, nothing was more common than for people to be beguiled by the jars in their shop windows, and to think what a grand thing it must be to be a chemist, and parents would come and anxiously desire them to take an apprentice, and offer a handsome premium. The result was some took boys without inquiring whether they had had such a preliminary school training as would render it easy for them to go through the work they had to do. When you had a boy you could not supply him with brains, but you could watch what he appeared capable of, and lead him in the direction in which he appeared to be best able to go and most likely to succeed. As a general rule he had discovered that, without a single exception, out of twelve or fourteen cases all his apprentices had passed, but in two or three cases they had been turned back three or four times. The result in his opinion was this, that the curriculum rule would be cheaper to a youth, and to his friends ; if they knew that they would adopt it at first instead of going round the back-stairs course, and spending a great deal more in the end.

Mr. MARTIN (Newcastle) said one gentleman complained that the Society spent so much money in law costs and recovered so few penalties. But the object was not to recover penalties, but to restrain people from breaches of the Pharmacy Act, and the cost of doing so was borne by the Society. Another had complained that enough had not been spent in prosecuting breaches of the Act, and he said that he himself knew scores of cases which had not been prosecuted. He would put it to that gentlemen whether he had not been guilty of a dereliction of duty in not reporting those cases to the Council. To his mind the result was most satisfactory. With regard to the criticisms made on the examinations, it was somewhat depressing, no doubt, for any candidate to come up from Yorkshire or Cornwall, and fail in passing, but he failed to see what good end would be obtained by allowing a man who completely failed on the first subject to go on with the others, except that of imposing so much more trouble on the examiners. As a Local Secretary, he would say that if any person reported to him a breach of the Act, he should at once take steps to ascertain whether a breach had been committed, and if so, to report it, and in every case in which he had sent a report to the Council attention was paid to it. The Local Secretaries were not highly paid, and they could not be expected to go about canvassing the neighbourhood for breaches of the Act.

The PRESIDENT then said he would refer in a few words to the criticisms which had been passed, although Mr. Martin had answered much that Mr. Furness had referred to. He would take, first of all, the questions raised by Mr. Robinson, Mr. Furness, and Mr. Smith, on what they called trade matters, and he would appeal to Mr. Robinson as to how he felt at this moment after what Mr. Furness had said about the Early Closing Bill. He said the Council had no instructions, and therefore ought not to have moved, and were they not to use their discretion ! Surely the Early Closing Bill was a trade question, and while, on the one hand, he might be supported in this case by Mr. Robinson, and he knew they had the support of the majority of chemists and druggists, Mr. Furness came up with all the authority of the Association at Sheffield, and said the Council ought not to have interfered.

Mr. FURNESS said he simply pointed out that it was strange the Council should do that after a certain line of action had been taken by the trade.

The PRESIDENT asked if Mr. Furness had not said he disapproved of it.

Mr. FURNESS replied in the negative.

The PRESIDENT said he was glad to find that Mr. Furness agreed with him.

Mr. HALL remarked that all the gentlemen present were principals in business, but they ought to bear in mind that the Shop Hours Regulation Bill affected assistants and apprentices and their rights ought to be considered.

The PRESIDENT said the Council had not opposed the Bill. He wanted to point out to Mr. Robinson the dilemma in which trade matters would sometimes place the Council. For having taken action in one direction they were criticised and told, in the same breath, that in another direction they had neglected their duty. Now he wanted to point out the difficulty they were placed in with regard to dealing with such questions. Mr. Robinson had asked whether if thirty or forty members were unjustly attacked the Society would do something to defend them. His answer was that whenever such a case was put before the Council he did not doubt the answer would be, Yes, when any great principles were involved. When anything objectionable or erroneous had been mooted, the Society had always done what it could ; but it could not become a trade protection society in the strict meaning of that term. It would be the death of the Pharmaceutical Society if it became such an association ; at any rate that was his opinion. Great questions affecting the mass of the members it could deal with, but individual cases where members of the trade were sailing very close to the wind of the law were not cases for a corporate body like that to deal with. There were only two courses open to those who talked about trade questions. If they want a trade protection in the widest sense they must not go to that Society for it ; it would only spoil other individual cases. They must get up an organization supplied with funds,—not with half-a-guinea a year, but with considerably more,—and have an active executive, small in number, who must have absolute power to do what it pleased and not publish its proceedings to be criticised by the subscribers or the world. That was true trade protection. It might or might not be a desirable thing to have, but if they wanted it they must go in for it. But they could not come to a Pharmaceutical Society, nor could they have gone to the Association to which reference had been made, and expect it to do what was required for the modest sum of money placed at its command. Any special case affecting the trade as a whole, the Council would not refuse to consider, and, if need be, take action. If the Council had a case put before it and had a doubt whether it was within its powers to proceed in the direction aimed at by the memorialists, there would be a Council of outside men who would put their hands in their pockets and give time and organization, and do as they did in Betts's case, and crush the

aggressor if necessary. He would plead guilty to neglecting trade interests if it meant trade protection of the kind he referred to. The Council would not object to render assistance to defend important trade interests; but if it were a legal question the Council must be satisfied that it was a proper case in which to take proceedings. All who were connected with corporate bodies knew that there was always a small minority of men who had grievances; who wanted the assistance of the Solicitor and all his staff every day of the week, and it was exceedingly difficult to get at the truth in personal matters. Mr. Robinson had referred to the Inland Revenue, and he had received many letters from time to time, both in former years and since he had been President, from men throughout the country with regard to the Patent Medicine Stamp Act in which grievances had been alleged. He might venture to say what the Secretary of the Association referred to had to tell the members at an annual meeting in London, that in nearly every case in which he had made inquiry, the individual had undoubtedly broken the law, and in most cases had done so with his eyes open, or had sailed so near the wind as to lay himself open to a penalty. In one case in ten perhaps there was a case of distinct hardship which could be dealt with, and then it had not been necessary to consult the Council; he had only to write a letter to the Government Department, and put the case before it in order to receive every consideration, and if the statement made to him was perfectly true, even though there might be a technical breach of the law—as there was in many patent medicine stamp cases, the penalty was remitted. When he had a good case and made application the answer was perfectly clear and unmistakable, the penalty was remitted, and thanks were given for advising the department. He had known men complain of the Society for not protecting trade interests, and they would not subscribe, and within three months such a man would come and say the Somerset House authorities were down upon him, as he called it. On examining into his case it would appear quite clear. He showed a label and the stuff, and declared solemnly that that was how he sent the article out to be sold, and he had no advertisement and nothing to bring it within the regulations of the Board. He (the President) said at once if that were so he was sure the authorities had made a mistake and would not insist upon the penalties. When he went down to Somerset House with the bottle and label in his hands the documents would be produced, and it would be found that this gentleman had got a most beautiful advertisement as to the merits of this particular preparation as a remedy for all sorts of things, which he did not put round the thing liable, but round another preparation; and the Solicitor would ask him: "Do you think a man of that sort is entirely innocent of intention to defraud the revenue?" What could he say in such a case? That showed how difficult it was to move in trade matters without producing discord. If the Council were blamed for proceeding cautiously in trade matters let it be on the true motive that it hesitated to move in directions where by getting the approval of one section it would be incurring the enmity of another. Naturally, therefore, it avoided many questions of that kind. The Early Closing Bill was a very fair instance of its proceeding. It might not be agreeable to some, but from his knowledge of the trade he thought everyone was in favour of early closing. If Sir John Lubbock's efforts were successful he would not want any clause with regard to chemists and druggists, so far as the general trade was concerned. If they were willing to avoid late hours they would follow the rest of the people without any Act of Parliament, and if they were not willing the Act would not compel them, because under the exception clause they would be able to illuminate the whole neighbourhood, shutters being now practically things of the past. With regard to the Pharmacy Acts Amendment Bill, it had not cost the Society as yet £5. It had cost a great deal to some other people in loss of time, brain power, and so on, and perhaps the Law and Parliamentary Committee might have a claim brought against it for loss of health in watching its progress through Parliament. There were many other law matters included in the Bill, such as the preparation of the lease of new premises and things of that kind, but he wished thoroughly to disabuse Mr. Furness's mind of the idea that the whole of that money had been expended in procuring the penalties which the Society had recovered, though they often had to expend £20 in order to get £5. Then Mr. Furness said they ought to have spent more in law expenses. He probably meant in parliamentary expenses. They often found men evade the law, and if they got a man convicted he found a way of meeting the case, still more unsatisfactory to the chemists in his own town. That could not be altered except by going to Parliament, and therefore, he took it, Mr. Furness meant they should go to Parliament. That did not necessarily mean spending money in law. What they wanted in connection with Parliament was not the assistance of a lawyer, but of intelligent members of the trade throughout the country who could use influence and show that they had got a good case. That would not cost the Society money, but it would cost effort, and the greatest difficulty was to get their friends throughout the country to exert themselves. If Mr. Furness could assist in that direction he would do more good than by any amount of money. He thanked the meeting for the courteous way in which it had received his observations, but before putting the resolution he would say one word with regard to the examiners. He had often said before that anyone who had never been an examiner did not know how difficult it was to deal with candidates. They could not expect an examiner to be sent down from Heaven, having special qualifications for his office. Even the best examiner, who desired to make the candidate before him comfortable, might adopt some method or make some observation which only had the effect of making the candidate more and more nervous. It was one of the essential difficulties of practical examination in six subjects in one day, that men were extremely nervous. A good deal had been said about dispensing, but men had to dispense before the public; they had not all a little screen before them, and nerve did count for something. He would admit there were many parts of the examination which were trying, where, for instance, the dispenser had to proceed, in a strange place, to make up a prescription with two pairs of eyes facing him, which was, no doubt, a trying process. On the other hand it was one of the tests, which, above all others, they were supposed to carry out in a way which was fair and reasonable. When they had larger premises which were principally for the purposes of examination it was proposed that one of the rooms should be a dispensary or dispensing laboratory, in which there might be a larger number of candidates examined at once, and they would be all more comfortable. But the examinations after all were practical performances, they cost money, and unless the men were examined for a much longer time you could not very well give opportunities for repetition. But with a full knowledge of what went on in London and Edinburgh, with as wide an experience of examiners as most men in the Society, knowledge acquired at an early age, and with quick perception, he might say that, having visited the examiners of the College of Surgeons and elsewhere, there was no body of men who took more pains, or as a rule who took as much pains as the Boards of Examiners of that Society. He hoped, therefore, when they listened to the grievances of a candidate they would bear in mind the circumstances. No doubt the poor fellow was terribly upset, and he exaggerated unconsciously the treatment he had been submitted to. It was well known that there was an examiner some years

ago who was said to be an exceedingly nice fellow to all who passed, but a perfect brute to all who failed. That happened to be himself, and he was, therefore, able to speak on this subject from the point of view both of the candidate and of the examiner.

Mr. HALL asked if the President would kindly state the result of the dinner last night.

The PRESIDENT said the donations amounted to the sum of £1100, and the new subscriptions promised to £25 or thereabouts.

The TREASURER said there was one question of Mr. Furness's which the President had omitted to answer, viz., with regard to the amount at the bank; he might say that that was represented by the £1300 in the hands of the Treasurer. It was not in his pocket, but at the bank in his name.

The PRESIDENT added that, practically, according to the charter and the bye-laws, all the money was in the hands of the treasurer for the time being; but he was simply a drawer of cheques, everything which came in, or was paid out, having to go through the hands of a committee every month.

The resolution for the adoption of the Report was then put and carried unanimously.

Mr. FURNESS then rose to move the resolution of which he had given notice. He wished it to be quite understood that there was nothing antagonistic between himself and the Council, and he should be the last person to bring forward any individual grievance, but the question he wished to bring forward was one of general interest affecting a large section of the body. There were twenty-one pharmaceutical chemists who constituted the Council, and it might be said it was presumptuous in him, who was only an associate, to bring forward a resolution. He did so with a deep sense of responsibility and humility, and with great regret that some one more competent to do it justice had not taken the matter in hand. The resolution was—

> "That this meeting regrets that the Pharmacy Act Amendment Bill now before Parliament contains no amendment of section 19 of the Pharmacy Act of 1868, and requests the Council as promoters of that measure to take steps to introduce into the Bill a clause giving a more popular, satisfactory, and just system of representation to the pharmaceutical electorate on the Council of the Society which governs their affairs."

He asked the Council to grant a measure of justice to a deserving class. Some two months ago, on reading the text of the Bill now before Parliament, he was much struck with the main proposals it contained; but considering the time that had elapsed since the passing of the Act of 1868, he thought it did not go sufficiently far, and, although he was in hearty accord with the principles of the measure, and should like to see it become law, and had done his best to bring about a curriculum of this sort, since the idea was first mooted by Professor Attfield, he thought it did not go far enough in the direction he had referred to. He had also read carefully the discussion that had taken place in the Council, and even after reading the thoughtful speeches then made, he thought that the difficulties, which were weighty in his mind, although not in the same direction were weighty on the mind of the Council, were not such as could not be overcome. The discussion resulted to a great extent in adopting the principle of not introducing contentious matter into this Bill, or anything calculated to jeopardize it, and in that he quite agreed; but he was still of opinion that there was one flaw which had been detected in the past Acts which could have been included with safety, and would even have been more calculated to facilitate its passing, because it would be simply granting a measure of justice to men who were entitled to it, and would raise no opposition from outsiders. The constitution of the Society, as was well known, consisted of members, pharmaceutical chemists; members, chemists and druggists; chemists and druggists; associates in business; associates not in business; and apprentices and students. The numbers were as follows: 1758 pharmaceutical chemists, 694 chemists and druggists, members of the Society: 1281 associates in business; 899 chemists and druggists on the Register, associates not in business, and the remainder 1194 apprentices and students. During the last two months he had given a deal of thought to this question, and so strong was his conviction that something ought to be done, that he felt it his duty to attend that day and see if the Annual Meeting would not grant to one of the most deserving and numerous classes of the Society some proportion of representation on the Council. By the 19th section of the Act of 1868, it was enacted that every person who was, or had been, a chemist and druggist when the Act passed, should be eligible for a seat on the Council if he became a member, and also that the Council should never contain more than seven members who were not pharmaceutical chemists. It was the principle he was concerned with, not the individual members of the Council; they had good men there deserving of the high eulogium passed upon them last night; but at the time the Act passed there were no associates in business, and, therefore, it was easy to understand why no provision was made for their having a seat on the Council. The only two classes really entitled to that position were those who were pharmaceutical chemists, and those who were practising as chemists and druggists, who had the option of becoming members. Since then the members had become less and less, and the associates more and more numerous. All who, after the passing of the Act, became chemists and druggists, if they wanted to become connected with the Society, unless they chose to become pharmaceutical chemists, must be associates, and whatever might have been said of that class at that time could not be said now. The reason given for excluding them had been growing less and less, and the question now required immediate attention for the welfare, if not for the safety, of the Society. The more popular the representation on the Council which had to govern a constituency, and the more it reflected the strength of that constituency, the more vigorous it was, and the more capable of perfecting its work. By sec. 19 the associates were excluded by implication, but by implication only. Sec. 20 said that anyone who subsequently passed an examination, and was placed on the Register, might be elected an associate, and he had often wondered whether that was a distinction in favour of the members or of the associates, but they knew by experience which way it had operated. He claimed that it should never have existed, but if it existed it was in favour of the associates, since they were examined, but a number of chemists and druggists who were members had not passed the examination. Sec. 20 said that so long as he was in business on his own account, and continued an associate he might attend all the meetings and vote thereat, and otherwise take part in the proceedings of such meetings in the same manner as members, provided he contributed to the funds the same as the members. He had not seen the question raised before, and did not know whether an opinion had been given whether this could be construed that associates might have a seat on the Council, and he regretted very much that greater publicity had not been given to this matter. The question of the representation of a corporate body was rather too important to be dealt with at the tail end of a meeting, without notice having been given, but he felt certain that this was such a matter of justice that the meeting would see it was expedient to agree to it. He was willing even at the eleventh hour to withdraw the matter if he were convinced that it was inopportune, because he was anxious to see the curriculum measure passed, and would not suggest this addition if he thought it would jeopardise it. Still, it was not enough to say that if he introduced this somebody else would in-

troduce something else which would be contentious matter. He simply asked where was the opposition to come from; it was simply a matter of internal organization and representation. Would it come from their own body? Would it not rather reconcile the opposition which had already been aroused? He did not wish to make any comparison between the associates in business and the other members of the Society, although he thought they would bear a favourable comparison, but he would just point out the amount which the associates contributed, namely, £1800 to the revenue.

The PRESIDENT asked where Mr. Furness got these figures?

Mr. FURNESS said there were in round numbers 2000 chemist and druggist associates.

The PRESIDENT asked if he proposed to give the associates not in business a vote?

Mr. FURNESS said he did not propose to formulate any scheme. He was proposing that associates in business should have a seat on the Council, and if thought expedient he should like to see those not in business have a vote; they were all men of intelligence, they had the "hall mark" of the Society, and were quite as competent to exercise the franchise as the burgesses of large cities who elected Parliamentary and Municipal Councils. In round numbers there were 2000 chemists and druggists on the Register who were associates, producing £1800 a year, and forming the largest class connected with the Society, and yet they had no seat on the Council. The chemists and druggists not associates were 700, and they were entitled to seven seats. The pharmaceutical chemists were 1542, and they subscribed £1600. That was a state of things to which he wished to call the attention of the meeting. He proposed this resolution with the view of giving the Council an opportunity of acceding to it, instead of taking any other course which might be open to him to get a clause introduced into the Bill. The President said how anxious the Council and he personally were to ameliorate the condition of the Society, and he thought this would be an opportunity for him to show it.

Mr. SANDELL asked if he should be in order in moving that the meeting adjourned for one hour for luncheon.

Mr. FURNESS said that after that intimation he would not trespass any further on the time of the meeting.

The motion having been formally seconded,

The PRESIDENT said he would not detain the meeting long upon this matter. When gentlemen came to the meeting to talk about pharmaceutical politics they generally expected them to look back to the history of their case, and know something about it. If Mr. Furness had gone back to the history of the Pharmacy Act of 1868 he would have found out that the reason why associates in business had not a vote was on account of a compromise, obtained after infinite trouble, with representatives of the trade outside the Society, and with representatives of the members inside. Having taken part in the passing of that Act he would remind Mr. Furness that the efforts of the Society in early days to obtain the proper Pharmacy Act with proper powers were always frustrated by members of the drug trade outside the Society, who always wished to become pharmaceutical chemists, and to this the pharmaceutical chemists objected. The draft Bill of 1866, which was really the only complete Pharmacy Act he remembered, was an Act drafted by the Society, and practically accepted by the Government; but before anything could be done those who did not belong to the Society objected, and said the Bill should not pass unless they were made pharmaceutical chemists as well as members of the Society. To that the pharmaceutical chemists objected; an opposition Bill was brought in by a society called the United Society of Chemists and Druggists, dealing almost exclusively with poisons. Both Bills were referred to a Select Committee, and as the result, a report was presented which dealt with the sale of poisons, but did not affect the internal arrangements of the Society. That being so, the Society as promoters of legislation had to consider what could be done to obtain unanimity, and accordingly a large part of his time and that of others was taken up in talking to those outside the Society, pointing out what he called the unreasonable character of the project, and as the result of the discussion the Council at that time came to the conclusion that an equitable arrangement could be made with all chemists and druggists in business by making them members of the Society.

Mr. FURNESS said he was pretty well acquainted with the history of the Pharmacy Act of 1868, but it did not strike him that it was necessary to place that before the meeting.

The PRESIDENT said he wanted to show the members that it was an arrangement come to on two sides, and that before altering that arrangement both sides must be consulted. The views of the chemists and druggists who took an interest in the Act outside that Society and the views of those who were inside practically culminated in this arrangement, that the pharmaceutical chemists who had passed the examination said emphatically they would not allow every chemist and druggist to come on the Register as a pharmaceutical chemist, but they were persuaded rather against their will, that it was desirable to get all men in as members. That was what Mr. Furness wanted, and he sympathized with him. He only referred to this to show the position in which they stood. The view at that time was that in future every one who passed the Minor would pass the Major, and they would all become members. The associates were looked upon as those who would be in the state of assistants, and would go forwards afterwards and become members. It was actually proposed that all who passed the Minor examination should be members, which would have prevented the present complaint, but the pharmaceutical chemists would not have that; they pressed their views so much on the members of the Council that they had to accept the solution as a compromise. At that time they thought more of the title than of the political principle; they said we do not like a man who passes the Minor being called M.P.S., while the pharmaceutical chemist has the same title. The political point did not come up so much. The then President, Mr. Sandford, who had done so much for the Society in every possible way, was far-seeing enough to propose to let every man who had passed the Minor become a member, but although he was President he was outvoted on that point. The objection he saw to putting forward this proposition now was that they had not asked a very large number of the pharmaceutical chemists what they thought of it. The present Council was practically in sympathy with Mr. Furness, and he might refer to the fact that, without any pressure from outside, but solely from a consideration of the constitution of the Society, a majority of the same Council had drafted a Bill and submitted it to the Government, which was published in the Journal in February, 1883, in which this very point was dealt with, only in a different way, and, he thought, in a more effectual manner. No one could deny that associates in business should have a vote, and that they should have seats on the Council, and the same political privileges as members, but it was thought better to deal with the thing from a different point of view, and, if possible, to abolish the distinctions in the Society. The proposition was, that after a certain date every person who passed the Minor should be registered as a pharmaceutical chemist. There would then be one class of practising chemists and druggists eligible for membership with all political powers. Then the next clause provided that every person who was registered as a chemist and druggist, and examined, should be eligible to become a member. The proposal was, in short, that there should be only one class of dispensers of medicine, who should be eligible to become members with all privileges. That was a convincing

proof that the then Council was in favour of doing what it could to give political representation to every one. But Mr. Furness proposed to go now to Parliament to amend the Bill in some such direction, and argued that there could be no opposition from the inside. He asked them to take his own statement, from a stiff personal fight against this very proposed Act in 1883, with regard to the pharmaceutical chemist members. Those members had rights, and they objected to every man who passed the Minor having the same privileges. It was not correct, therefore, to say that all the members were agreed on this matter, nor would it be fair, seeing that the Bill had been about three months before the members and no comment made upon it, to put in an amendment of that kind without full consideration. The numbers were against the contention raised. The present members were greater in number than the associates; therefore, if a majority went for anything it was the other way; seeing there were more members than associates in business they could not say that the members would necessarily agree with the proposition. In fact, he was in a position to say that a large number were of a different opinion. If they went to alter the Bill to please the associates they would have opposition coming from the members for altering an arrangement which had been come to without due notice. Having shown, therefore, that the Council had already committed itself to a generous policy with regard to the constitution of the Society, and having decided to go to Parliament on one branch of the subject, he hoped the meeting would agree with the Council in thinking that it would be very undesirable that this resolution should be passed. Mr. Furness said this was non-contentious matter, but he had failed to prove that. The two thousand associates might wish to have full political privileges, but the other two thousand members might object; at all events it was debateable ground, and he thought the better way would be to deal with the subject at some future time on the lines of the Draft Bill he had referred to, rather than to do it piecemeal in the way proposed. If the motion were pressed the Council would be obliged to vote against it, but he hoped that after this explanation it would be withdrawn. It was somewhat like putting a pistol at their heads to come to a meeting, and say when the Bill was in committee, if you consent to put this new matter into the Bill I shall support it, but otherwise I shall reserve the right I have of opposing it. There were three things to be dealt with in a Pharmacy Bill; the question of the sale and dispensing of poisons, the internal management of the Society, and the question of education. The Council had thought it wise to divide these into three distinct parts, and to take up that part about which a great deal of work had been done, and on which a great majority were agreed. But it was none the less sympathetic with everyone for whom Mr. Furness had spoken, for, as he often said, the associates were the backbone of the Society. The difficulty in the present case was not with the Legislature, but in getting their own members and associates to understand clearly the Bill which was in Parliament, for he often found they sent letters objecting to this and other Bills, written in such a style as to show they could not know what the Bill was intended to do. That, of course, partly arose from the use of legal phraseology, but it was not all *couleur de rose* in the present House of Commons, and if Mr. Furness thought he had sufficient influence to get the Bill considered as amended, and to get it agreed to by their own members without opposition, the Council might consider it, but he was quite certain that that was not the case.

Mr. FURNESS said he did not propose to deal with the question of titles at all, and that covered a great portion of the President's remarks. With regard to presenting a pistol at the head of the Council, he would simply say that two months ago he wrote to the press drawing attention to this matter, and asking if it were an oversight that it had not been dealt with. That letter appeared in the *British and Colonial Druggist*, and in the *Chemist and Druggist*, but the editor of the Society's Journal did not publish the letter, and he had received no official reply. It was that which had impelled him to come to the meeting to give the Council an opportunity of answering the question he put two months ago. The resolution did not interfere with the question of titles, and, as he understood, that was what aroused opposition before. Even now he would withdraw the motion if the President would show where the opposition was to come from, and that it was likely to interfere with the present Bill.

The PRESIDENT said the one matter could not be dealt with without the other. Many members of the Society objected to associates having all the privileges of members.

Mr. URWICK applied to Mr. Furness to withdraw the motion for the present, and remarked that it was a much larger question than he had any idea of. It cut at the educational question, because it would lead to admitting on the Council men of the lowest standard of education, who would have the control and deal with the examiners

The SECONDER remarked that at present some of the members were not examined at all.

Mr. URWICK said that was a compromise arrived at in the way the President had pointed out. The object had always been to insist on the highest standard of education; they did not wish to shut out associates, but to induce them to pass the Major examination.

A MEMBER said the idea of the Council was to offer an inducement to men to pass the Major examination, and if that were taken away it would be breaking faith with the Major men, who certainly ought to be consulted before any change were made.

Mr. NEWSHOLME wished to say, with reference to an observation which had fallen from the President, that neither Mr. Furness nor himself held a brief for the Sheffield Society; they simply came on their own account. He did not agree with Mr. Furness entirely, though he went part of the way with him, and he thought the present was a very inopportune time to add such a clause to the Bill. Some months ago they had a meeting in Sheffield on this very subject and were almost unanimous, but not quite so, as one gentlemsn dissented. They were all pretty unanimous on bringing forward the associates, but of course it would necessitate an alteration of title.

The PRESIDENT again appealed to Mr. Furness not to press the motion, because if he did it would have to be opposed by the Council, which might give a wrong impression, and make the associates think the Council was opposed to their claims, whereas the only question was one of time.

Mr. FURNESS said it was evident the motion would not be carried, though he thought, if he convened a special meeting, which would be extremely inconvenient, by circularizing all the associates, he had no doubt he could carry the motion; but in the face of the impossibility of carrying it at present, owing to publicity not having been given to it, he would withdraw it if his seconder agreed.

The SECONDER said he was entirely in accord with Mr. Furness and he hoped the Council would take the matter into early consideration, considering it had been before it since 1883.

Mr. FLETCHER then asked if he should be in order in moving a resolution to this effect:—

> "That in the opinion of this meeting the acknowledged practice of the Board of Examiners of prohibiting a candidate who failed in one subject from proceeding further with his examination is contrary both to the spirit and letter of section 16 of the Pharmacy Act of 1868, and is calculated to inflict great injustice on a large class of candidates.

The PRESIDENT said the meeting had no power to propose or carry such a resolution.

A number of gentlemen were appointed Scrutineers.

The PRESIDENT called attention to the following Registers, which were placed before the meeting in compliance with the Acts of Parliament.

Register of Members, Associates, and Apprentices of the Society.
Register of Pharmaceutical Chemists.
Register of Assistants.
Register of Apprentices and Students.
Under the Act of 1852.
Register of Chemists and Druggists.
Under the Act of 1868.

Mr. BELL (Hull) said, for the first time he believed at such a meeting, he had to propose a resolution of thanks to the President, Vice-President and Council for their services during the past year. Many of these gentlemen had devoted considerable time and money to looking after the interests of the Society, and he thought the members in years past had been very remiss in not proposing a vote of thanks to them for their past services.

Mr. FURNESS seconded the motion with very great pleasure, as he thoroughly appreciated the services these gentlemen had rendered to the Society.

The motion was carried by acclamation.

The PRESIDENT declared that the following gentlemen were unanimously elected Auditors for the ensuing year:—

HODGKINSON, WILLIAM, 198, Upper Whitecross Street, E.C.

HOPKIN, WILLIAM KING, 16, Cross Street, Hatton Garden, E.C.

LESCHER, FRANK HARWOOD, 60, Bartholomew Close, E.C.

STACEY, SAMUEL LLOYD, 300, High Holborn, W.C.

WATTS, WILLIAM MANNING, 32, Lower Whitcross Street, E.C.

The PRESIDENT thanked the meeting on behalf of his colleagues for the flattering way in which their services had been referred to, and declared the meeting adjourned until four o'clock on the following day to receive the report of the Scrutineers.

ADJOURNED GENERAL MEETING.

Thursday, May 19, 1887.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The adjourned meeting for receiving the report of the Scrutineers was held on Thursday, May 19.

The Chairman of the Scrutineers, Mr. Thomas Howard Hall, read the following report:—

SCRUTINEERS' REPORT.

We, the undersigned Scrutineers, appointed at the Forty-sixth Annual General Meeting of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us, and report the following: —

Voting papers reported by the Secretary to have been issued	3541	
Voting papers received	1718	
Voting papers issued but not returned	1823	
Voting papers received		1718
Voting papers disallowed:—		
Informal	21	
Received by post too late	74	
	—	95
Voting papers registered		1623

Result of the Poll.

Atkins	1305	Newsholme	1034
Symes	1301	Williams	1022
Southall	1299	Evans	1004
Baildon	1281	Robbins	975
Cross	1230		
Savage	1197	Martin	951
Carteighe	1188	Butt	884
Hampson	1146	Harrison	848
Hills	1140	Watt	760
Richardson	1066	Neve	685

THOMAS HOWARD HALL, *Chairman.*

J. W. BOWEN.	T. HOWELL WILLIAMS.
JOHN MORRIS BROAD.	THOS. HENRY POWELL.
JOSEPH M. FURNESS.	T. O. SANDELL.
S. J. WESTON.	F. BASCOMBE.
HENRY BATE.	F. CRESSWELL.
EDWARD B. STAMP.	HENRY MATHEWS.
WM. MURTON HOLMES.	THOS. S. DYMOND.
WM. ARKINSTALL.	J. W. SHEPHERD.
WILLIAM WARREN.	W. H. SYMONS.
WM. HOWELL.	ALBERT COOPER.
HENRY C. BIRCH.	R. FISHER YOUNG.
W. RALPH DODD.	S. F. BURFORD.
ROBT. SAML. BATHE.	

THE NEW COUNCIL.

The Chairman then declared that the following gentlemen would constitute the Council for the ensuing year:—

ALLEN, CHARLES BOWEN, 20, High Road, Kilburn, N.W.

ATKINS, SAMUEL RALPH, Market Place, Salisbury.

BAILDON, HENRY BELLYSE, 73, Princes Street, Edinburgh.

BOTTLE, ALEXANDER, 37, Townwall Street, Dover.

CARTEIGHE, MICHAEL, 180, New Bond Street, W.

CROSS, WILLIAM GOWEN, 70, Mardol, Shrewsbury.

EVANS, GWILYM, 7, Stepney Street, Llanelly.

GOSTLING, THOMAS PRESTON, Market Hill, Diss.

GREENISH, THOMAS, 20, New Street, Dorset Square, N.W.

HAMPSON, ROBERT, 205, St. John Street Road, E.C.

HILLS, WALTER, 225, Oxford Street, W.

NEWSHOLME, G. T. WILKINSON, 74, Market Place, Sheffield.

RADLEY, WILLIAM VALENTINE, 42, Hampton Road, Southport.

RICHARDSON, JOHN GEORGE FREDERICK, Elmfield, Knighton, Leicester.

ROBBINS, JOHN, 147, Oxford Street, W.

SAVAGE, WILLIAM DAWSON, 23, Freshfield Road, Brighton.

SCHACHT, GEORGE FREDERICK, 52, Royal York Crescent, Clifton, Bristol.

SOUTHALL, ALFRED, 17, Bull Street, Birmingham.

SYMES, CHARLES, 14, Hardman Street, Liverpool.

WILLIAMS, JOHN, 16, Cross Street, Hatton Garden, E.C.

WOOLLEY, GEORGE STEPHEN, 69, Market Street, Manchester.

The President, in proposing a vote of thanks to the Scrutineers for their arduous services in examining the returns, said that the Society was fortunate that year after year so large a number of Members and Associates were found willing to undertake this work.

The vote of thanks was passed unanimously, and the proceedings closed.

EVENING MEETING IN EDINBURGH.

The fourth Evening Meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday, May 11, at 8.30. Mr. H. Bellyse Baildon, Chairman of the Executive of the North British Branch, in the chair.

The minutes of last meeting having been read and approved, a paper was read on—

An Accurate Method for Determining Specific Rotatory Power.

BY W. PEDDIE. B.SC., F.R.S.E.

The paper is printed at p. 941, and gave rise to the following discussion :—

The Chairman, in moving a vote of thanks to Mr. Peddie for the interesting and lucid way in which he had described his method for determining specific rotatory power, said there could be no doubt as to the superior accuracy of a method in which position took the place of a particular shade of colour. This paper suggested to him that it would be a good thing if candidates for the Preliminary examination could show that they possessed some knowledge of the working of simple equations such as were now brought before them.

Dr. Clark said he had not had a very extensive experience in the determination of specific rotatory power, but he had felt the practical difficulty attending determinations which depended on a comparison of shades, and he was exceedingly gratified to see the ingenious and accurate arrangement devised by Mr. Peddie. He had at first some difficulty as to how the value of n was to be found; the problem had been very completely elucidated. Of course the difference between the rotatory powers of two substances would be the same, although the value of n was not found, and probably, in most instances, pharmacists would be content to remain in ignorance of it. He seconded the vote of thanks, which was unanimously awarded.

Two papers were then read on—

Solubility of Morphine Hydrochloride, Salicin and Gallic Acid.

BY D. B. DOTT, F.I.C., F.R.S.E.

The Purification of Fixed Oils.

BY D. B. DOTT, F.I.C., F.R.S.E.

The papers are printed on p. 941, and gave rise to the following discussion :—

The Chairman said they were much indebted to Mr. Dott for the many valuable contributions with which he had favoured them. An accurate record of solubilities was of much practical value to the pharmacist. He had much pleasure in moving a vote of thanks, which was cordially awarded.

Dr. Clark said he would like to ask Mr. Dott in what respect the oils were improved by his process.

Mr. Dott said this was merely a preliminary note. He had not had time to test the process fully. He should perhaps have said decolorized rather than purified, but he thought that if that were done the oils would also be improved in other respects.

A paper was read on—

A Simple Method for Percolation under Pressure.

BY THOMAS MABEN.

The paper is printed on p. 941, and gave rise to the following discussion :—

Dr. Clark said he did not quite understand what Mr. Maben meant by producing exhaustion equal to about two atmospheres. In his experience he had never attained more than from 16 to 25 inches of mercury. That was about two-thirds of an atmosphere. With regard to the hastening of percolation he had not found it necessary. He did not approve of the practice of reducing drugs to a fine state of division before percolation. It was quite unnecessary, and if the drug were roughly powdered percolation proceeded easily, and might even require to be retarded. There were many other pharmaceutical operations, however, in which increased pressure was advantageous, as, for instance, in filtering a thick extract. The object aimed at in Mr. Maben's arrangement might also be attained very simply by attaching a long tube to the bottom of the percolator. In all such arrangements the valve mentioned in the paper was an essential requisite, as the slightest alteration in the water pressure would cause it to rush back into the receiver. They were much indebted to Mr. Maben for having brought this suggestion before them. He thought practical pharmacists did not sufficiently avail themselves of such aids. It was an arrangement which was capable of being adapted to a large variety of pharmaceutical apparatus, and he had much pleasure in moving a hearty vote of thanks to Mr. Maben.

The vote was seconded by the Chairman, who expressed regret that Mr. Maben could not be present, and unanimously awarded.

A paper was then read on—

Irish Moss as a Substitute for Gum Arabic in Pharmacy.

BY PETER BOA.

The paper is printed on p. 942, and gave rise to the following discussion :—

The Chairman said this was an interesting communication on the practical pharmaceutical uses of Irish moss. They were much indebted to Mr. Boa for his notes on practical pharmacy, and he had much pleasure in moving a hearty vote of thanks.

Mr. Nesbit said at the present time an efficient substitute for gum arabic was of importance. He was struck by the evident emulsifying power for cod liver oil shown by the Irish moss mucilage. Its apparent preservative influence against oxidation in the mistura guaiaci was also of note, and it would be interesting to know if it had any such effect in the case of iron salts as, for instance, in Griffith's mixture. With regard to its unsuitability for suspending subnitrate of bismuth, he had observed the same in the case of tragacanth. He had not found that the same objection applied to subcarbonate of bismuth. He felt much obliged to Mr. Boa for the trouble he had taken, and seconded the vote of thanks, which was unanimously awarded.

Mr. J. B. Stephenson said he recollected many years ago conducting some experiments with a view to obtaining a suitable substance for making bandoline. Among other things he tried Irish moss and was surprised at the strength of mucilage which it yielded by cold maceration. He had some recollection that the objection to it was that it would not keep. The objection that it formed a hard compound with bismuth subnitrate applied also, though perhaps not to the same extent, to gum arabic. In fact he knew of one practitioner who would not allow any agent to be employed to suspend insoluble powders, and who was in the habit of ordering chalk mixture without the gum.

Mr. Thompson asked if the gum arabic cod liver emulsion was the best Mr. Boa could get. His experience was that a much better emulsion could be made.

Mr. Boa replied that what he was testing was rather the suspending than the emulsifying power of the moss and gum, and, therefore, the emulsions had been made by simple shaking up. He had found that the oil could be obtained in a much finer state of division by means of gum arabic than by moss, and he observed that a similar experience had been met with by American pharmacists.

Mr. Boa then exhibited a variety of commercial sugars and syrups made therefrom. The conclusion he had come to was that the first quality of any commercial sugar would give satisfactory results. Difficulties only cropped up when second qualities were employed.

Attention was then directed to two donations to the Museum.

Palembang Benzoin recovered from Table Bay, lost in 1691. From Mr. C. F. HENRY, Edinburgh.

Living Plants of *Gelsemium nitidum*.

From Dr. E. R. SQUIBB, Brooklyn, New York.

The Chairman then said that this meeting concluded the session. He thought he might congratulate them on the success which had attended the meetings. Their best thanks were due to the gentlemen who had contributed papers, and he trusted that all would exert themselves, so that next session they might have many more of equal interest and ability.

Mr. Nesbit said they ought, before separating, to acknowledge the valuable services of their Chairman during the past session, and he would therefore move a vote of thanks to him for the efficiency and ability with which he had discharged the duties of the chair.

The vote was unanimously passed with acclamation.

The Chairman having returned thanks, the meeting was closed.

Provincial Transactions.

DOVER CHEMISTS' ASSOCIATION.

The quarterly meeting was held at the Apollonion Hall, on Wednesday, the 11th inst. Mr. J. F. Brown in the chair.

The minutes of the previous meeting having been read and confirmed, a circular, issued by the Executive of the Chemists and Druggists' Trade Association of Great Britain, was discussed, and the following resolution carried unanimously :—

"It is desirable that an association should be maintained for protecting the trade interests of chemists and druggists on the lines of the circular issued by the Executive of the Chemists and Druggists' Trade Association of Great Britain on May 6, and this meeting hereby approves of the same."

The instructions recently issued to excise officers respecting medicines liable to stamp duty were then read and discussed, and it being the opinion of the members that the Act would thereby be unduly strained to the great inconvenience and annoyance of chemists, the following resolution was passed and ordered to be sent to Council of the Pharmaceutical Society :—

"The chemists of Dover beg to call the attention of the Council of the Pharmaceutical Society to the harsh and arbitrary scope of the instructions recently issued by the authorities at Somerset House to excise officers respecting medicines liable to stamp duty."

BRIGHTON ASSOCIATION OF PHARMACY.

A meeting of this Association was held in the Mayor's room of the Town Hall, on Tuesday evening, May 17. The President, Mr. W. D. Savage, J.P., occupied the chair, and there was a small attendance of members.

The minutes of the previous meeting were read and confirmed.

The Treasurer (Mr. Cornish) presented his report which showed a balance in hand of £24 10*s.* 10*d.*

The President next explained the provisions of the Pharmacy Act Amendment Bill, and after a short disdussion it was resolved, on the motion of Mr. Savage, seconded by Mr. Caton, "That the Amendment Bill of the Pharmaceutical Society be approved—at the same time this meeting trusts that some means may be devised whereby the suggestions recently submitted to the Council by the chemists of Brighton may be carried out, and unqualified men be prevented from infringing the legitimate trade of qualified chemists and druggists."

This was followed by a discussion on the advisability of offering prizes annually to chemists' apprentices in Brighton for proficiency in chemistry, etc., and it was decided, on the motion of Mr. W. W. Savage, seconded by Mr. E. T. Salmon, that two prizes of the value of 21*s.* and 10*s.* 6*d.* be this year offered by the Brighton Association of Pharmacy to students under 21 years of age attending the night classes in chemistry at the Brighton School of Science and Art. Mr. Salmon proposed, and Mr. W. W. Savage seconded, and it was carried unanimously, "That with the object of promoting a spirit of mutual goodwill, and affording an opportunity of social reunion, it is desirable that a dinner should be held at such time as may be deemed convenient, to be the first of a series of annual reunions amongst the chemists of Brighton and Hove ; and that a small committee be appointed to carry this resolution into effect." The following gentlemen were appointed on the committee :—Messrs. Billing, Caton, Salmon and Leigh.

A vote of thanks to the Chairman terminated the proceedings.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The annual general meeting of this association was held on Wednesday evening, 11th inst., when the report of the year's proceedings was read and the financial statement rendered. The affairs of the Society were shown to be in an eminently satisfactory condition. The work had produced good results, and the summary of the class and laboratory instruction proved the educational branch to be flourishing and progressing most favourably. As the result of the class examinations the following students were awarded prizes :—Botany, Messrs. T. L. Hollely and A. S. Smith (special) ; Chemistry, Mr. J. T. Ellinor ; Materia Medica, Mr. J. Smith ; Practical Chemistry, Messrs. Golland and J. T. Ellinor (special) ; President's prize for all subjects, Mr. J. T. Ellinor.

The election of officers and council for the year being proceeded with, resulted as follows :—President, Mr. J. M. Furness ; Vice-President, Messrs. J. H. Bradwall and W. H. Maxey ; Treasurer, Mr. G. T. W. Newsholme ; Honorary Secretaries, Messrs. G. A. Grierson and Jno. Humphrey ; Auditors, Messrs. G. A. Cubley and C. D. Morrison ; Members of Council, Messrs. Appleton, Ellinor, Lowe, Morrison, Preston and Rhoden.

The business of the evening was concluded by votes of thanks being conveyed to the retiring officers and council, special praise being awarded the Ex-President (Mr. Newsholme), and Secretary (Mr. Bradwall) for the thoroughly conscientious manner in which they had discharged their duties, and striven for the wellfare of the Society.

Parliamentary and Law Proceedings.

HIGH COURT OF JUSTICE, QUEEN'S BENCH DIVISION.

Before the Lord Chief Justice and Mr. Justice Smith.

May 17, 1887.

WHITE *v.* BYWATER.

This was an appeal on a case stated by the stipendiary magistrate for the borough of Sheffield, who had refused to convict the respondent on a charge under the Sale of Food and Drugs Act, 1875.

Mr. Wormald, who appeared for the applicant, said the facts as set out on the case stated by the learned magistrate were shortly these. The appellant, who was the medical officer of health for the borough of Sheffield, in November last went to the shop of the respondent Bywater, who was a chemist and druggist, and asked for 3 ounces of tincture of opium ; having been supplied with it he informed the respondent that he bought it for the purpose of analysis, and divided it into three portions as required by the Act. Upon an analysis the tincture was found to contain, as appeared by the certificate of

the analyst affixed to the case, 56·8 proof spirit instead of 100, as required by the B.P., and morphia 2·3 instead of 7·5, in other words, the result of the analysis showed that the sample did not contain much more than half the proof spirit, and one-third the quantity of opium which the B.P. tincture contained. Of course there was something else, and the analysis did not state what it was, but it might be presumed with tolerable certainty that it was water, whilst the B.P. tincture would appear to be composed wholly of proof spirit and opium. The correctness of the analysis was not disputed, and the evidence given on behalf of the complainant was that of himself, Mr. English White, M.D., and Alfred A. H. Allen, Public Analyst, Thomas George Wilkinson and Mr. Newsholme, President of the Sheffield Pharmaceutical Association. They deposed that "tincture of opium" was a well-understood term in the trade; that the material sold by the defendant was not of the nature, substance and quality as understood by persons usually dealing in that article, thus coming clearly within the words of the sixth section of the Act of 1838 and 1839, Vic., chap. 63 : "No person shall sell to the prejudice of the purchaser any article of food or any drug which is not of the nature, substance and quality of the article demanded by such purchaser under a penalty not exceeding £20." He contended that on this evidence, which was uncontradicted, the defendant ought to be convicted. The learned stipendiary, however, considered that he ought to dismiss the complaint on the following grounds :—That if the purchaser had in some way especially asked for "tincture of opium," made according to the recipe of the B.P., and had been supplied with a tincture professed to be so made, there would be a ground of complaint, but that in this case no such special request had been shown. He should contend that was quite unnecessary in a case like this, "tincture of opium" being a well-known article in the trade, and the defendant, being a chemist dealing in such articles, must be taken to know what it was.

The Lord Chief Justice asked if it was not a question of degree.

Mr. Wormald thought not in this case. Here was a substance sold one-third of the strength of that ordinarily known as "tincture of opium."

The Lord Chief Justice said he understood it was one-third of the strength of the B.P. tincture. Did Mr. Wormald go so far as to say that anything of less strength, or which differed appreciably from the B.P., would come within the Act?

Mr. Wormald said not an infinitesimal difference of course, but he should contend that this was exactly similar to the case of a man going into a public house and demanding to be served with a pint of brandy. If the publican gave him a mixture which was one-third brandy and two-thirds water that was brandy and water, not brandy, which was a very different thing; it was not of the nature, quality and substance of the article demanded.

The Lord Chief Justice remarked that the purchaser would get the brandy, although he had water mixed with it.

Mr. Wormald said, if he asked for a pint of brandy, and only got one-third of a pint of brandy and two-thirds of a pint of water, he should submit that was not a substance of the nature and quality demanded.

Mr. Justice Smith said he understood the contention to be that this article was not of the quality demanded, that the purchaser asked for the tincture of opium of commerce.

Mr. Wormald said, Yes, that was the point.

The Lord Chief Justice asked if it was not a well-known fact that you got much stronger drugs at some places than at others. There were people, at any rate in London, who had a name for particular drugs. He understood there was a very strong solution of opium termed "Batley's solution."

Mr. Wormald said that was a totally different thing to tincture of opium, it was double the strength of the B.P. tincture.

The Lord Chief Justice asked how it would be supposing he asked for tincture of opium and were supplied with "Batley's solution."

Mr. Wormald said that would be very improper ; it would not answer the description of tincture of opium, and it would be highly dangerous.

The Lord Chief Justice said he really thought it must be a question of degree, and that a man obtained that which was substantially of the nature, substance and quality demanded if it were not adulterated to such an extent as to make it useless.

Mr. Wormald said in this case the purchaser demanded 3 ounces of tincture of opium, and what he got was what was equivalent to 1 ounce of the ordinary tincture of opium plus a small quantity of proof spirit, and the rest was water, and that did not seem to be a fair compliance with his demand. He then drew attention to the fact that under the Pharmacy Act, sec. 15, it was illegal to compound any medicines of the B.P., except according to its formularies. He then read the formula for tincture of opium from the B.P., and pointed out that the evidence in this case was that the defendant did not compound this, but got the opium from some one else, so that he could not be summoned under the Pharmacy Act. There would, therefore, be the curious result if the decision were right that the person who made this tincture and sold it as tincture of opium could be affected under the Pharmacy Act and fined, and yet it would be lawful for someone else to sell this illegal mixture. On these grounds he submitted that the decision of the learned magistrate was wrong, and that on the evidence before him he ought to have convicted. He would also call attention to paragraph 8 of the case, which he thought had been inserted by the learned stipendiary in order to suggest to the court that the B.P. was not the authority by which the chemists ought to compound their drugs. He then cited Bell on the Food and Drugs Act, who said:—"There is no direction in the Act how an article is to be compounded. A clause in the Bill provides for compounding drugs according to the B.P., but it was struck out in the House of Lords." That might be so; he did not know whether it was or not, but he could see a very good reason why the House of Lords should have struck it out. The Pharmacy Act was anterior in date to the Food and Drugs Act, and therefore the compounding of drugs was already provided for by the section to which he had referred.

No one appeared in support of the magistrate's decision.

The Lord Chief Justice, in giving judgment, said: I should have been glad to have heard the case argued, but I must decide it on the evidence before me, and the evidence that strikes me as important is the evidence in paragraph 5, in which the learned magistrate sets out that a certain number of persons, apparently intelligent persons, a doctor of medicine, a medical officer, public analysts and so forth, six or seven of them, depose—it is put in a general way—that tincture of opium was a well-understood term in the trade, and that the material sold by the defendant was not of the nature, substance and quality of tincture of opium, as understood by persons usually dealing in that article. The above-mentioned witnesses also deposed that the B.P. preparation was the only one recognized by the medical profession, and by pharmacists generally. That is the evidence which the learned magistrate has very candidly and properly returned to us, and I have no doubt he has extracted it fairly. What is the result of it? The result of it is that in terms these witnesses, who certainly by their description appear to be highly competent witnesses, swore that the drug sold in this case was not of the nature, substance and quality demanded by the purchaser. I say "demanded by the purchaser," because it must be taken, in the absence of any proof to the contrary, that

he was a person dealing in the article, and wanting the article, and the person who sold it was a chemist and druggist, and it was proved or admitted—proved, I think—that the B.P. preparation was the only one recognized by persons in his position, and that this was not according to, nor anything like according to the B.P. The analysis shows that. That is not in the fifth paragraph, but in an earlier paragraph of the case. Under these circumstances what is one to do? The magistrate has decided on the ground that he did not ask for tincture of opium according to the B.P.; but he asked for tincture of opium, and he did not get that which all the evidence in the case shows to be a stuff of the nature, substance and quality generally understood as tincture of opium by people dealing in it. I cannot but think that, that being found, as there is no evidence on the other side, and we have heard no argument on the other side, I am reluctantly—I say that simply on account of the magistrate—brought to the conclusion that he is wrong, and the case must be remitted to him.

Mr. Justice Smith: I am of the same opinion. The applicant at the repondent's shop asked for 3 ounces of tincture of opium. Now what is the meaning of that? I think, and that is where I differ from the learned magistrate, the meaning of that is 3 ounces of the tincture of opium of commerce, or the article which is usually sold by way of commerce as tincture of opium. If that be so, then the evidence before the magistrate is all one way, because the evidence of the gentlemen whose evidence has been set out on the depositions, is that this tincture of opium is a well-known term in the trade, and the material sold by the defendant was not of the nature, substance and quality of tincture of opium as understood by persons usually dealing in that article. It seems to me, if that be so, the purchaser did not get a drug of the nature, substance and quality of that which he asked for.

Mr. Wormald: It will be judgment for the appellant with costs?

The Lord Chief Justice: Yes.

NEWTON AND WIFE *v.* CIVIL SERVICE SUPPLY ASSOCIATION.

This action was in the list for hearing before Baron Pollock and a special jury on Thursday last, but at the sitting of the Court Mr. Lockwood, Q.C., who with Mr. Edward Morten appeared for the plaintiff, said the case had been settled upon terms which it was not necessary to make public. The terms had been put in writing, and he would hand them to his lordship and ask for judgment in accordance with the terms arranged.

Mr. Jelf, Q.C., said he appeared with Sir Charles Russell and Mr. C. Mathews for the defendants; they had considered the matter and agreed to the terms.

Baron Pollock: I can quite understand that it is desirable to arrange the matter. I know something of the case, as it came before me at chambers.

Mr. Lockwood: Your Lordship gives judgment in accordance with those terms.

Baron Pollock: Yes.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

UNFAIR COMPETITION.

Sir,—Is there really, then, no hope of redress? Is it absolutely futile to imagine that by a combined and sustained effort on the part of the trade and its sympathizers Parliament may be induced to repair the leak in a previous Act, and thus put an end to the unfair competition of bogus and other stores? Has everything been done by us that possibly can be done to this end? If not, are we not foolish to idly fold our hands and allow our weapons to rust, while every day that passes strengthens the position of the enemy, and renders the task of dislodging him more and more difficult?

These questions have been suggested to my mind by the incident of the Brighton petition to the Council (reported in your pages), and the certainly not very encouraging remarks let fall by one or two of our leading lights on that occasion.

We are all very well aware that, as Mr. Savage says, in the present state of the law the Council is powerless to prevent the sale of poisons by these companies, but the stating of this unfortunate fact is no answer to the Brighton petitioners. What they desire (and what, if their action be imitated, as it deserves to be, by chemists throughout the country, I believe it is not unlikely they may obtain), as I understand it, is not that the Council should attempt the impossible under the present law, but that supported, as it would then be, not only by the class of which it is peculiarly the representative, but also by a body of men possessing much greater parliamentary influence—medical practitioners—it should again make a strong effort to procure an amended Pharmacy Act.

I am aware that it is believed by many, that to expect at this time of day (as they put it) legislation of a protective kind is little short of madness. The mere whisper of "protection," it is held, is quite sufficient to bar the passage of any Bill in these free-trading times. In many cases it is so, but I maintain, that in setting up this principle in the present case as an ogre, guarding (for us) the gates of Parliament, we are needlessly terrifying ourselves by imagining horrors which either do not exist at all or, at the worst, are much less formidable than we suppose. For, it must be evident to every one, that if the Pharmacy Act of 1868 (the spirit of it, I mean, not the letter) means anything at all, it means that chemists and druggists (in the public interest, of course), having passed certain examinations, and having thereby qualified themselves for the exercise of a responsible calling, are understood to be granted a certain amount of "protection." Some of that protection we still enjoy; part, a very important part, has been lost to us, by what we think a quibble of law. It is surely then not unreasonable to expect, that if we approach Parliament in a proper manner and prove to the lawmakers of the nation that we really desire it, they will grant to us again that which, I hold, they have already said we have a right to possess.

Again, if a slavish adherence to free-trade notions is to prevent the passage through the Parliament of to-day of a Bill such as this, why did not such opinions prevent the passing of the 1868 Act? Are free-trade principles stronger now than they were then? Is it not notorious that they are not?

I am convinced that it is not from any abstract principle of this kind that our strongest opposition will come. That opposition (though it may use the arguments) will be prompted by a spirit, the very opposite of that which stirred to action the pioneers of the free-trade movement. The greater bulk of it will be the offspring of selfishness, the selfishness of the every day increasing number of those who are profiting by our misfortune, and waxing fat at our expense.

I earnestly hope, therefore, that the example set by the Brighton chemists will be promptly and enthusiastically followed, and if it be, I am quite sure that the Council of the Pharmaceutical Society will not fail to do its very best to give effect to the wishes of its petitioners.

Edinburgh. T. G.

Andover.—The practice of pharmacy in Ireland is regulated by the Pharmacy Act (Ireland), 1875, and the examinations are under the control of the Pharmaceutical Society of Ireland.

Candidate.—The Regulations of the Board of Examiners may be obtained by application to the Secretary, 17, Bloomsbury Square.

Apprentice.—Bentley's 'Manual of Botany.'

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Allen, Helbing, Smith, Finsterlin, Haydon, Hutchinson, Crow, Heise, Alison, Allan, Modlen, Cook, Salmon.

Extract. Cinchonæ Liq.

(De Vry.)

IMPORTANT.

IT having come to our knowledge that preparations are being sold as EXT. CINCHONÆ LIQ. (DE VRY) which are not of our manufacture, we desire to call special attention to the fact that we possess the exclusive right in this country to use the name of "DE VRY" or "DE VRIJ" in connection with Extract of Cinchona.

The title, *EXTRACTUM CINCHONÆ LIQUIDUM (DE VRY)*, being registered as a Trade Mark, we shall not hesitate to take immediate proceedings against any person infringing the same, and Pharmacists are respectfully cautioned against purchasing the Extract in other than original bottles, of which the annexed is a *facsimile*.

EXT. CINCHONÆ LIQ. (DE VRY) is supplied in $\frac{1}{4}$-lb. bottles at 3*s*. 6*d*., $\frac{1}{2}$-lb. bottles at 6*s*. 6*d*., and 1-lb. bottles at 12*s*. each, and may be obtained through any Wholesale House.

SPECIAL QUOTATIONS FOR QUANTITIES IN BULK.

ON RECEIPT OF A POST CARD, TRIAL SAMPLES WILL BE SENT FREE TO ANY ADDRESS.

FLETCHER, FLETCHER & STEVENSON, Manufacturing Chemists, London, N.

Extractum Cinchonæ Liquidum.

Messrs. HOWARDS & SONS,

Referring to the recent papers on the above subject, desire to call attention to their

"Ext. Cinchon. Liq. H. & S., Calisaya,"

"Ext. Cinchon. Liq. H. & S., Succirubra,"

which are prepared from selected Cinchona without the use of mineral acids, contain the whole alkaloidal contents of the bark, are uniform in quality, and carefully standardized. Each preparation contains 48 grs. alkaloids per fluid ounce, the former representing fine *verde* Calisaya, and the latter good Succirubra.

Packed in 4, 8, or 16-oz. Bottles, or Bulk.

May be ordered through any Wholesale Houses. Prices for large quantities on application.

SOLUBLE PODOPHYLLIN.

LIQ. PODOPHYLLIN HOCKIN

THIS PREPARATION CONTAINS NO COLOURING MATTER.

Miscible (bright) with Water, Acid, or Alkaline Solutions, also with Decoctions, Æthers, Infusions, Tinctures, etc. One Drachm equal to Podophyllin pur ¼ grain

Liq. Podophyllin (Hockin) is offered as a solution of Pure Podophyllin, easily and elegantly dispensed with other drugs, or simply diluted (one drachm to half ounce of water) as a reliable remedy in gastric disturbances generally consequent upon torpidity of the liver, and should be on every dispensing counter.

We shall be glad to forward Sample and Pamphlet Free on Application.

Price for Dispensing, 16 oz. Bottles, 7/-; 8 oz. Bottles, 4/-; 4 oz. Bottles, 2/6. Larger Bottles, 6/9 per lb.
All bottles & packing free, postage only charged as follows: 16 oz. & 8 oz. bottles, 6d.; 4 oz. bottles, 3d. extra.

PREPARED ONLY BY

HOCKIN, WILSON & CO. Wholesale Druggists and Manufacturing Chemists,

38, DUKE STREET, MANCHESTER SQUARE, LONDON, W.

PEARS' SOAP

A SPECIALTY FOR INFANTS

SIR ERASMUS WILSON, F.R.S. (*Late President of the Royal College of Surgeons of England*) Writes in the *Journal of Cutaneous Medicine*:—"The use of a good Soap is certainly calculated to preserve the skin in health, to maintain its complexion and tone, and prevent its falling into wrinkles. . . . PEARS is a name engraven on the memory of the oldest inhabitant; and Pears' Transparent Soap is an article of the nicest and most careful manufacture, and one of the most refreshing and agreeable of balms for the skin."

SHOP BOTTLES & JARS

WITH VITRIFIED (burnt in) LABELS.

Black letters on White or Pink ground. Glass Drawer Labels to match.

NEW POISON BOTTLES, ribbed blue glass, with **raised** White vitrified letters and the word "Poison" in Red at foot.

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Telegraphic Address—"POTHS LONDON."

A Standard List of Labels for Chemists' Shop Bottles, Jars and Drawers, has just been published, and will be sent free on application.

CHUBB'S BEST SEIDLITZ POWDERS

Full Weight—Howard's Materials, Loose, at **7s.** per gross, and in lift off boxes, **7s. 6d.** per dozen; hinged boxes, **8s. 6d.** per dozen

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In 1d. Boxes, **6s.** gross, and 2d. Boxes, **11s.** gross, and in ¼-lb. and ½-lb. Packets, **10d.** per lb.

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In 1d. Boxes, **5s.** gross, and 2d. Boxes, **9s.** gross, and in ROUND BOXES, 3d. size, **1s. 6d.** per dozen, 6d. size, **2s.** per dozen

SUBJECT TO 15 % DISCOUNT FOR CASH.

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ROBINSON & CLEAVER'S ROYAL

IRISH CAMBRIC

Children's Bordered, per doz.	1/2		Hemstitched:		
Ladies' ... ... „	2/4½		Ladies' ... ... per doz.	2/11½	
Gents' ... ... „	3/6		Gents' ... ... „	4/11	

SAMPLES FREE. **POCKET HANDKERCHIEFS.**

IRISH DAMASK TABLE LINEN

SEND FOR SAMPLES, FREE.

Fish Napkins, **2/11** per dozen. Dinner Napkins, **5/6** per dozen. Table Cloths, 2 yards square, **2/11**; 2½ yards by 3 yards, **5/11** each. Kitchen Table Cloths, /11½ each. Strong Huckaback Towels, **4/6** per doz. Frilled Linen Pillow Cases, from **1/4½** each. Initials, &c., Woven and Embroidered. Samples and Illustrated Price Lists, post free to any part of the World. **ROBINSON & CLEAVER,**

By Special Appointments to H. M. the Queen and H. I. and R. H. the Crown Princess of Germany.

BELFAST.

BARBER'S ORIGINAL CRIMSON INK

FOR MARKING LINEN,

Which is Changed by Heat to a Jet Black.

Put up for Retail Sale in 6d., 1s., 2s., 2s. 6d. and 5s. Bottles.

ALSO

Barber's Concentrated Liquid **COCHINEAL** for Colouring Jellies, Custards, &c.

Put up in 6d. and 1s. Bottles.

MANUFACTURED ONLY BY THE PROPRIETORS—

G. Barber & Co., 6, Worcester Drive, Club Moor, Liverpool.

Can be obtained through any of the Wholesale Firms, or from the Proprietors, G. BARBER & CO., Club Moor, Liverpool.

THE

Aromatic TEROZONE Disinfectant

REGISTERED No. 25,555.

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AIR PURIFIER

DIFFUSES A REFRESHING AND PURIFYING PERFUME.

The TEROZONE purifies the air and generates ozone by simple and spontaneous evaporation.

The marvellous health-giving and invigorating properties of the fragrant *Eucalyptus* are by this means effectually utilised for diffusing through the atmosphere a most refreshing and purifying perfume.

The aromatic and disinfecting virtues of the Eucalyptus are now fully recognised by the highest medical authorities.

Placed in any Apartment, Sick-Room, Nursery, Lavatory, &c., &c., the "TEROZONE" acts as a deodoriser and imparts an agreeable and healthy aroma.

12/- PER DOZ.

The TEROZONE POWDER sold in Packets, 6d. each.

Invented and Prepared by the Makers of the celebrated Eucalyptus Oil Soap—

WHITAKER & GROSSMITH,

22, SILK STREET, CITY, LONDON.

TRADE MARK.

DR. JOHN FRANCIS CHURCHILL'S INHALANT "SPIRONE"

TRADE MARK.

FOR THE TREATMENT AND CURE OF ALL

Diseases of the Lungs, Windpipe, Nose and Throat,

Claims to be a Specific for all Congestive and Inflammatory conditions of the Respiratory Apparatus, and will be found efficacious in

TRADE MARK

REGISTERED.

COUGHS & COLDS, ASTHMA, BRONCHITIS,

Inflammation and Congestion of the Lungs, Pneumonia, Pleurisy, Whooping Cough, Croup, Diphtheria, Pharyngitis, Laryngitis, Catarrh, Sore Throat, Quinsy, Enlarged Tonsils, Hoarseness, Loss of Voice, Colds in the Head, Ozœna, Hay Fever and all other Complaints of the Respiratory Organs.

PREPARED ONLY BY THE INVENTOR.

None Genuine except such as bears the Trade Mark and his Signature upon the Bottle, on the Label over the Cork, and on the Wrapper,

JOHN FRANCIS CHURCHILL, M.D. (Paris),

The Discoverer of the Specific Cure for Consumption, and of the Medicinal Properties of the Hypophosphites.

Price 4s. 6d. and 11s. per Bottle. **Set of Apparatus for Administration, 15s.** **Pamphlets free on application.**

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HOMŒOPATHIC MEDICINES

SUPPLIED DIRECT OR THROUGH THE PATENT MEDICINE HOUSES.

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We are now preparing the above, which are **the only Oval Gelatine Coated Pills of English Manufacture** in the market. We are also issuing a **Special List**, which will be supplied on application.

The distinctive colours of the ingredients contained within them show through the transparent coating; and our Pills are admirably adapted for the **elegant administration of single drugs**, as well as compound pill masses. Thus, **our Quinine** (½ gr., 1 gr., and 2 grs.) **Pills are perfectly white, soluble, and tasteless.** We also put up **Aloin, Camphor. Monobrom, Cerii Oxalas, Pepsin,** etc., as well as smaller Pills of **Morphia, Acid Arsenios, Picrotoxia, &c.**

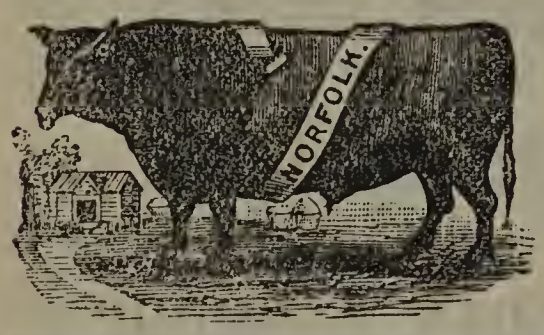
WYLEYS & CO. { Wholesale and Export Druggists and Manufacturing Pharmaceutists, } COVENTRY

And WYLEYS & CO. 1a, BURY STREET, ST. MARY AXE, LONDON, E.C.

Reduced Price List on Application.

The Proprietor of the

"NORFOLK" CONDITION DRENCHES



And other established "**NORFOLK**" Remedies for Horses and Cattle, begs to inform the trade that these Drenches are now in constant use by more than 1,000 Cowkeepers round London and other centres, besides a large consumption among farmers, &c., throughout the kingdom. When once introduced they are sure of a sale. Retail, ½-doz. tin, 4s. 6d.; 1 doz., 9s.; 3 doz., 22s. 6d. each. To be had direct of the sole Makers,

F. SUTTON & CO., NORWICH

Or through any of the London houses.

Handsome Counter Lists furnished to Sellers.

BY SPECIAL APPOINTMENT.

SPRATTS PATENT

MEAT 'FIBRINE' VEGETABLE DOG CAKES

BY SPECIAL APPOINTMENT.

(WITH BEETROOT).

DOG MEDICINES for the Cure of Distemper, Worms, Mange, Eczema, Ear Canker, Rheumatism, and the various other Canine Diseases. Full List and Pamphlet on Canine Diseases, post free.

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BISMUTH & MERCURIAL PREPARATIONS.

ETHERS, ESSENCES, FLAVOURS, &c.

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ACID. ACETIC., B.P., ACID. ACETIC. 1·040. Guaranteed made from Soda.
PEROXIDE OF HYDROGEN, for Bleaching Feathers, Hair, Silk, Jute, Ivory, Bone, &c.
METHYLATED ETHER, 730 for Refrigerators, 717 for Anæsthesia.
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Guaranteed Pure and Free from Arsenic.
LIQ. FERRI PERCHLOR. FORT., B.P. Free from Arsenic, and Soluble in Spirit.
HYPOPHOSPHITES OF LIME, SODA, &c. CYANIDE OF POTASSIUM.
Ferri et Ammon. Cit., Ferri et Quininæ Cit., B.P., and other Scale Preparations.

DUNN & COMPY., Stirling Chemical Works, WEST HAM, LONDON.

"MONTSERRAT" LIME-FRUIT JUICE

From THE LIVERPOOL JOURNAL OF COMMERCE, *February 28th*, 1887.

The "Hilda" has just reached the Mersey from Montserrat, her entire cargo, consisting of 50,000 gallons of lime juice, being the first arrival of the new crop. The demand for this article is increasing to such an extent that it may be of interest to the public to know that 180,000 gallons were sold during twelve months by the sole consignees, Messrs. EVANS, SONS & Co., Hanover Street, Liverpool.

CAUTION!

"MONTSERRAT"

(TRADE MARK)

THE MONTSERRAT COMPANY LIMITED · LIME-FRUIT PREPARATIONS · TRADE MARK.

LIME-FRUIT JUICE AND CORDIALS.

The success of the above has caused many IMITATIONS to spring up, many of them UTTERLY WORTHLESS Concoctions. It is, therefore, of the utmost importance to Traders as well as the Public to see that the trade marks of the MONTSERRAT COMPANY, Limited, and the SOLE CONSIGNEES, are on the Capsule of each Bottle. The word "Montserrat" is also duly registered as a trade mark. Legal proceedings will be instituted against all persons infringing the Trade Marks as above named.

SOLE CONSIGNEES—

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LONDON: EVANS, LESCHER & WEBB. | CANADA: EVANS, SONS & MASON. LIM., MONTREAL.

FROM ALL CHEMISTS EVERYWHERE.

USED IN THE ROYAL NURSERIES.]

MATTHEWS'S
PREPARED FULLERS' EARTH

Is superior to all other kinds for Protecting the Skin and Preserving the Complexion from Cold Winds, Redness, Roughness, &c.

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ROBARE'S AUREOLINE
OR GOLDEN HAIR WASH.

The attention of the Trade is respectfully called to the above Article, now having a large sale and giving an excellent profit to the retailer.

5/6 size ... ... 36/- per Dozen.
10/6 „ ... ... 72/- „

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AYRTON & SAUNDERS, Manufacturers of Superior WILLOW BOXES, have had many complaints from Chemists and Druggists throughout the country as to the difficulty of procuring, from the usual Wholesale Houses, their English-made **WILLOW BOXES**, and consequently are obliged to use those of foreign make, which usually are of an inferior, weak and fragile description, with insides full of sharp splinters, and tops and bottoms falling easily away, subjecting users to great annoyance and vexation. To remove this difficulty A. & S. are prepared to execute promptly any orders for their Goods direct from the Manufactory, and to facilitate business will forward, on receipt of six stamps to defray postage, a complete Set of Samples (18), each box marked with its proper size and description.

Prices and Discount forwarded with Samples.

Manufactory and Warehouses:—

149 & 153, DUKE STREET, & 62, PARR STREET, LIVERPOOL.

EDWARD'S DESICCATED SOUP.

(By Royal Letters Patent). HIGHEST AWARDS:—International Health Exhibition, LONDON, 1884. International Exhibition, LIVERPOOL, 1886. *Consists of the finest Vegetables and Extract of Beef in a dry state.*

The Manufacturers beg to direct the attention of the Trade to the above article, now commanding a ready and remunerative sale. It is put up in a neat and attractive form, in 1-lb., ½-lb., and ¼-lb. tins, to sell at 1*s.* 3*d.*, 8*d.*, and 4½*d.*; also in packets containing 1 oz. at 1*d.* These are packed in cases of 36 1-lb., 48 ½-lb., or 72 ¼-lb. tins; the 1*d.* packets in gross and half-gross boxes, in cases of 12 gross; carriage, tins, and cases free. A liberal supply of Show Cards, Glaciers, and printed matter, consisting of Circulars, Medical Testimonials, Press Opinions, and Counter Bills bearing name and address. Sample, with Terms, free on receipt of Business Card.—FREDK. KING & CO., Lim., 26, Waring Street, Belfast, and 6, Bishopsgate Avenue, London.

DELECTABLE JUJUBES, VOICE JUJUBES, AND GLYCERINE PASTILLES,

Put up in 4-lb. Decorated Tins with Glass Lids, *TINS FREE*, are now being inquired for by buyers from all parts of the world. They are not surpassed in quality by any maker, and give entire satisfaction.

MEDICATED AND HIGH-CLASS LOZENGES, of every kind,

Sent out in 2-lb. or 4-lb. Bottles, Bottles Free; or in Tins, from 10-lb. upwards.

LIME FRUIT TABLETS. MALT TABLETS.

ACID DROPS & BEST QUALITY BOILED SUGARS of EVERY KIND

ORIGINAL CHLORODYNE COUGH LOZENGES.

PENNY SUGAR WORM CAKES, suitable for either *children* or *adults*. Have an immense sale, keep in any climate, and please everybody. Manufactured by

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Price Lists sent on application. Our Goods can be bought through any Wholesale or Export House in London.

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SIR JAMES MURRAY'S
PURE
FLUID MAGNESIA

The Original Preparation of the Inventor,

Has been in use for over 60 years as an excellent remedy in cases of **Acidity, Indigestion, Heartburn, Gravel and Gout.**

Sold by all Chemists in Large-sized Bottles (the 1s. size containing just double the quantity usually sold at same price) at 1s., 2s. 6d. and 3s. 6d. each.

CAUTION.—Observe the signature of the Inventor on every label.

His **FLUID CAMPHOR** is a valuable remedy for **Sleeplessness** and **Weak Nerves.**

Bottles, 1s. and 2s. each.

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SIR JAMES MURRAY & SON,
CHEMICAL WORKS,
GRAHAM'S COURT, TEMPLE STREET, DUBLIN.
BARCLAY & SONS, 95, Farringdon Street, London.

PURE SPIRITS OF WINE.

To Wholesale Druggists, Chemists, Perfumers, &c.

WE are now supplying *Sp. Vin. Rect.*, extra and first qualities, at a very low figure for cash; free from smell, and perfectly clean, also in bond, for exportation.

Methylated Spirit & Finish, 64 O.P.

We are selling the above at the lowest possible cash price of the day, in quantities of Five Gallons and upwards. Quotations upon application.

Naphtha at current market rate.

Catalonian Sherry, 7s. 6d. per gallon, nett.

A good sound wine, combining body and strength, and specially adapted for medicated wines and other purposes.

Orange Wine, finest quality; guaranteed not to cause a deposit or become opaque by the addition of quinine. 5s. 9d. per gallon, nett cash. Second quality, 4s. 9d., nett.

Our Celebrated Pure Spirit of Wine

Is used by all the principal Wholesale Druggists, Pharmaceutists and Perfumers in town and country (54° to 65°), and will bear testing with Ammonia. It is allowed to be the best article for making Tinctures, Essences, and the most delicate Perfumes, being perfectly free from smell and fusil oil.

Packages to be paid for and allowed upon return.

E. BOWERBANK & SONS,
BISHOPSGATE DISTILLERY,
SUN STREET, LONDON.
Also at DUNNING'S ALLEY and 1, LAMB ALLEY.

N.B.—No connection with the house styled Bishopsgate Distillery and Wine Company.

ESTABLISHED 1782.

Effervescent Saline

This is a finely granulated preparation, which, in dissolving, produces a sustained sparkling effervescence, and a clear bright solution.

It possesses all the advantages of an agreeable Saline, combined with the anti-febrile properties of Chlorate of Potash. It is an excellent febrifuge, and makes a very pleasant and refreshing beverage, whilst, if taken before breakfast and in adequate doses, it forms an efficient aperient.

Supplied IN BULK, also in ½-lb. Bottles, labelled either with or without our Name and Address.

ALLEN & HANBURYS,
Manufacturers of Cod Liver Oil, Malt Extract, and Pharmaceutical Preparations.

Also of **MEDICATED** and other **LOZENGES**, and **IMPROVED JUJUBES,**

Wholesale & Export Druggists
PLOUGH COURT, LOMBARD ST., LONDON, E.C.

Works—Bethnal Green, E., and Longva and Kjerstad, Norway.

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BATHS OF HOMBURG

Near Frankfort-on-the-Maine.

The HOMBURG WATERS are very EFFICACIOUS and SALUTARY in diseases of the STOMACH and LIVER and in attacks of the GOUT.

UNRIVALLED SUMMER CLIMATE. SOVEREIGN CURE IN NERVOUS DEBILITY. The pure and bracing air from the mountains contributes largely to invigorate the system.

GRAND BATHING ESTABLISHMENTS, where baths of MINERAL and soft water are given, under medical prescription, with addition of MOTHER-LYE, EXTRACT OF PINE, liver of SULPHUR, &c. MUD BATHS highly recommended for rheumatism.

INHALATION from VAPORIZED SALT WATER for affections of the THROAT and the LUNGS.

Two Establishments for COLD WATER CURE, one of them in conjunction with a Gymnastic-orthopædica Institution.

WHEY CURE and Goats' milk. All kinds of Mineral Waters can be obtained.

First-class Orchestra, Regimental Bands, Balls, Reunions, Operas, Grand Concerts, Illuminations, Fireworks, Fetes, Champetres, &c. Toupie, Hallandaise, Bagatelle, CRICKET, and CROQUET, LAWN TENNIS. Good Shooting and Fishing in the neighbourhood.

Elegant KURHOUSE, with LADIES' CONVERSATION and READING ROOMS, open all the year. CAFE, BILLIARDS. The former RESTAURANT CHEVET under the same management.

Beautiful PARK, with shaded walks and comfortable seats. Extensive Carriage Drives through a vast Pine Forest. CHARMING ENVIRONS.

PURE AND LIMPID DRINKING WATER. Excellent drainage. Every condition of Hygiene fulfilled. Superior Hotels and Lodging Houses at moderate prices. Half an hour's railway ride from Frankfort-on-the-Maine.

THE MINERAL WATERS EXPORTED TO ALL PARTS OF THE WORLD.

"THE BEST NATURAL APERIENT."

Persistent attempts are made by interested parties to deceive the public by offering Natural Mineral Aperient Waters with marks, names, and designations very similar to those which are used by the **APOLLINARIS COMPANY, LIMITED,** for the **NATURAL MINERAL APERIENT WATERS** imported by them.

Under these circumstances the **APOLLINARIS COMPANY, LIMITED,** feel compelled to caution the public that the **HUNGARIAN BITTER WATER** sold by the **COMPANY** always bears the name of the **APOLLINARIS COMPANY, LIMITED,** on the Label.

Woodhall Spa.

BROMO IODINE MINERAL WATER.

The strongest known Mineral Water in the world. This remarkable Spa has been purchased by a syndicate of gentlemen, who have determined to make more widely known the extraordinary curative powers of this Spring, which contains more Iodine and Bromine than any Spring in Europe. An analysis of the water having been made in November, 1886, by Professor Wanklyn, M.R.C.S., corresponding member of the Royal Bavarian Academy of Sciences, Professor of Chemistry, a very important discovery has been made—viz., the presence of Free or Elementary Iodine.

Dr. WANKLYN says:—"So far as I am aware, this is the first instance in which free iodine has been found in appreciable quantity in a natural water. For many years the Woodhall Spa has been celebrated as a valuable remedy in skin diseases. The fact that it is a solution of free iodine is interesting in this connection, and well worthy of the attention of the medical profession."

The Woodhall Bromo Iodine Water is now being bottled at the Spring by the Sole Agents, BROMLEY & CO., Chemists, 233, High Street, Lincoln, 5 and 6, The Grove, Buxton, and Woodhall. All communications to be addressed to them at the Spa, Woodhall, Horncastle.

MAWSON'S FILTERS

Proven by Analysis to remove Lead, Lime in excess, Sewage and Bacteria.

Manufacturers, MAWSON, SWAN & WEDDELL, Newcastle-on-Tyne.

GOLD MEDALS EDINBURGH AND LIVERPOOL EXHIBITIONS.

FRY'S

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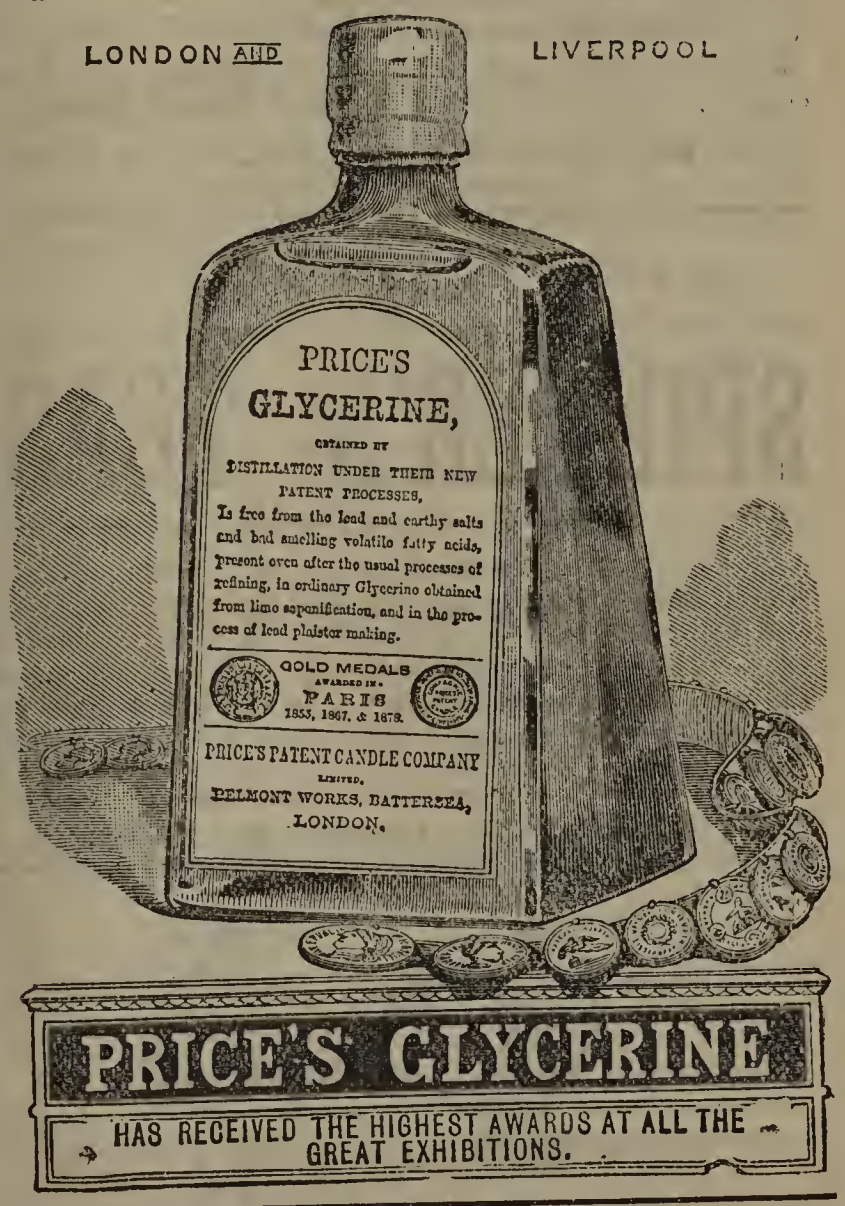

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„ F. W. Fox, Brighton.
„ W. Neilson, Blackburn.
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„ H. Williamson, Bedale.
„ H. H. Gourlay, Manchester (Feb.)

Three passed the Apothecaries' Hall examination, and three of Mr. Taylor's Preliminary class (all who went in) passed.

This pass list ends the **Ninth** of **Mr. Turner's** work as a teacher of Pharmacy, and he trusts that future years may not be less successful.

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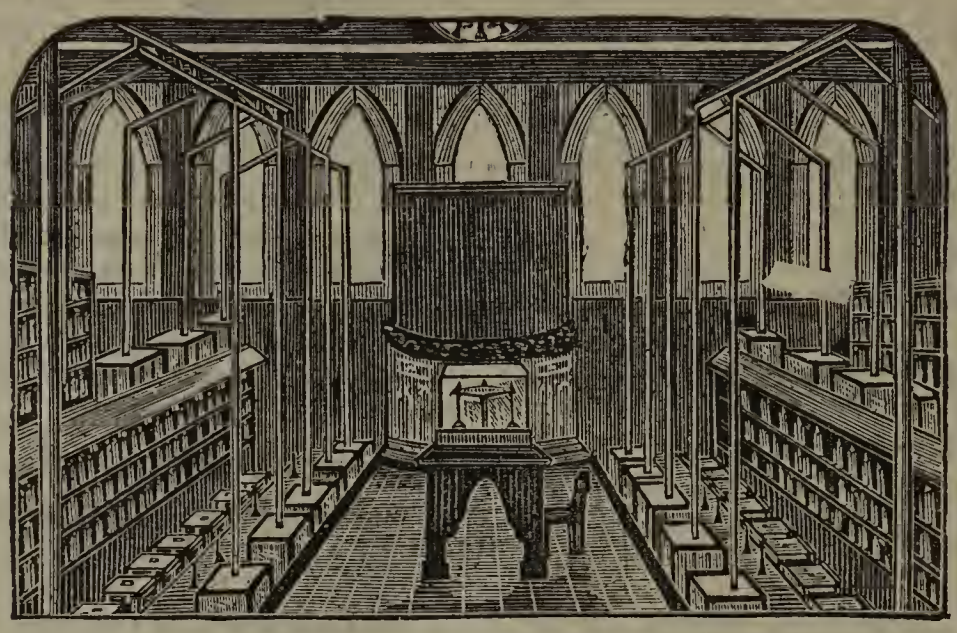

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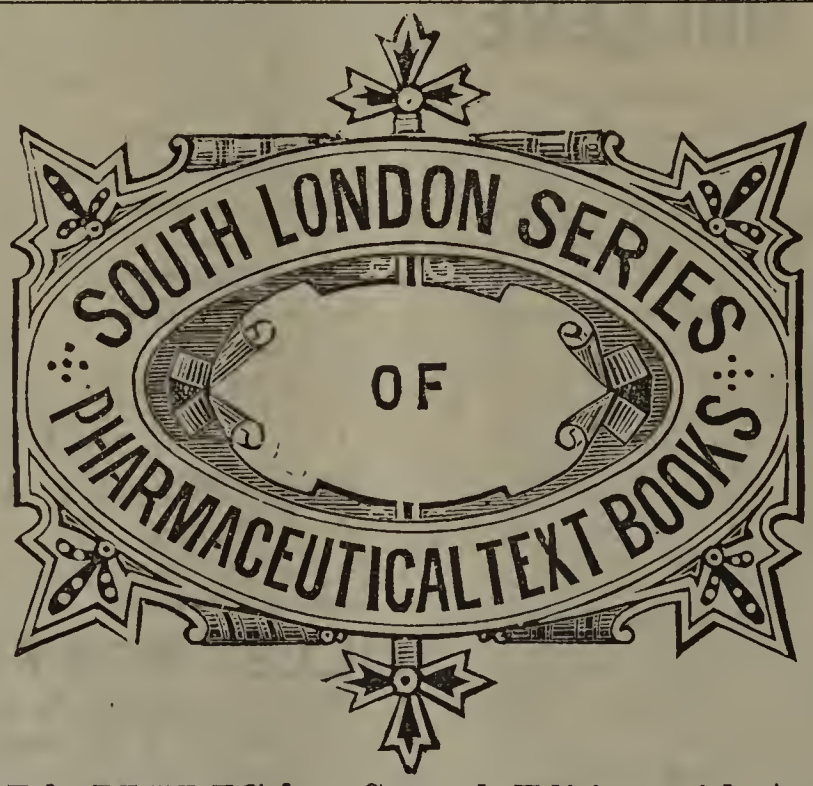

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 883.] SATURDAY, MAY 28, 1887. [PRICE FOURPENCE

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Pharmaceutical Society of Great Britain,

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SPECIAL NOTE.

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PRELIMINARY NOTICE.

Chemists and Druggists' Trade Association of Great Britain.

NOTICE IS HEREBY GIVEN, that a SPECIAL GENERAL MEETING of the Members of the Association will be held on Friday, the 17th of June next, to consider the expediency of winding up the Association.

Formal Notice, with time and place, will be given to each Member in due course.

By Order of the Executive Committee,

Office of the Association,
BIRMINGHAM, MAY 25TH, 1887.

W. F. HAYDON,
Secretary.

To the Members and Associates of the Pharmaceutical Society of Great Britain.

May 21, 1887.

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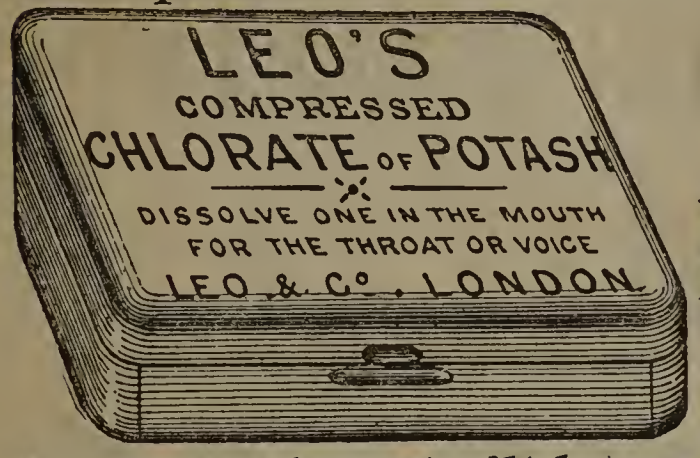

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Serpent Venom.

An interesting *résumé* of an important monograph by Messrs. Mitchell and Reichert on the venom of poisonous serpents, published by the Smithsonian Institution, appears in the *Dublin Journal of Medical Science* (May, p. 443). The authors, in a previous treatise (see *Pharm. Journ.*, [3], xiii., 1075) have pointed out that serpent venoms are not simple in composition, and have suggested that the differences in their power to kill and mode of causing death are due to differences in the quantity and quality of the constituents. It has been found that the solid matter suspended in fresh venom is inert, and that pure cultures of the micrococci constantly found in venom are without effect; the poisonous matter must consequently exist in solution. No alkaloids have been found, but the venoms contain certain proteid substances, to which the poisonous properties are attributed. These proteids are of two classes, globulins and peptones, the relative proportions of which differ very much in different venoms, the globulins preponderating in the venom of American snakes, and the peptones in the cobra venoms. Three kinds of globulin have been separated, one by the addition of water, one by dialysis and one by the cautious addition of cupric sulphate, and these have been named respectively "water-venom-globulin," "dialysis-venom-globulin," and "copper-venom-globulin." After the separation of the globulins the residue gives no precipitate on boiling, but still contains the peptones. A comparative study of the physiological action of the venom globulins and peptones showed that the globulins produce swelling and blackening of the parts by infiltration of incoagulable blood, modify the red corpuscles and produce molecular changes in the capillary walls; they are also powerful depressants of the heart and paralyse the respiratory centres. The peptones are more active in the production of œdema, in the breaking down of the tissues and in inducing putrefaction and sloughing. These and other distinctions explain the varying pathological changes which are caused according as the globulins or peptones preponderate in the particular kind of venom injected. When snake venom is brought into contact with the mucous membrane of the stomach in the intervals of digestion, sufficient absorption may take place to prove fatal, this being more probable with the diffusible peptones than with the indiffusible globulins, but the influence of the gastric juice is often sufficient to destroy either of them before absorption can take place. The best local antidote for snake venom was found to be potassium permanganate; bromine and strong alkalies also proved effective. Ferric chloride is useful to combat those venoms which owe their poisonous properties to globulins. But the authors consider it would be idle to search for a chemical antidote to the poison when once it has entered the circulation, because the active principles of the venom are proteid, and any agent acting upon them would also destroy the normal proteids of the blood.

Composition of Cow's Milk.

The results of an experiment made primarily to determine the variations in the proportion of phosphoric acid occurring in the milk of the cow have been recorded by M. Andouard (*Comptes Rendus*, civ., 1298). The experiment was made on four cows, one of which was fed on pasturage, with the necessary complement of hay and bran, while the others were fed with beet, swedes, potatoes, legumes, etc. It was found that the phosphoric acid in the milk underwent a progressive diminution during the period of lactation extending to 10·46 per cent on the initial weight in the case of the cow fed on pasturage, and ranging from 14·91 per cent. to 45·39 per cent. on the initial weight in the cases of those fed on roots, etc. It was also observed among other things that the butter, and especially the sugar, also diminished in quantity during the same period, whilst, with respect to casein, the milk from two of the cows contained an increasing proportion, while that from the other two contained a decreasing proportion. The paper does not contain any statements of absolute quantities.

Casein as an Emulsifier.

At the last meeting of the Paris Pharmaceutical Society M. Léger submitted some information respecting the employment of casein as an emulsifying agent (*L'Union Pharm.*, May 16, p. 193). Considering that natural emulsions, such as vegetable juices, milk, etc., owe their peculiar condition to the influence of albuminoid substances, he inferred that these substances might be utilized in preparing artificial emulsions if they could be separated in a form convenient for manipulation and preservation. Casein, which so perfectly emulsifies butter in milk, was chosen for the experiment. It was separated by adding 60 grams of ammonia to 4 litres of milk, and after twenty-four hours' contact removing the soapy layer that collected at the top, and then precipitating the serum with acetic acid. The magma of casein, after being strongly pressed, was mixed with 10 grams of sodium bicarbonate and sufficient sugar that the product should contain 10 per cent. of its weight of casein. This "saccharide of casein," when powdered, is said to be easily soluble in water and capable of being employed in the same proportion as gum in making almost any emulsion, without requiring the use of a mortar. The sole defect admitted by M. Léger is that the "saccharide" gives off a slight animal odour.

Lanolin versus Lard.

Further experiments made with a view of determining the relative value of lanolin in promoting absorption through the skin have been reported upon by Dr. Guttmann (*Med. Chron.*, May, p. 170), potassium iodide and salicylic acid being used, as being readily detected in the urine. Ointments of equal strength made with lanolin and with lard were used upon four different patients, and in the subsequent examination of the urine the most frequent and distinct indications of the absorption of the iodide or of salicylic acid were found after the use of the lard ointment. At any rate, the results are considered to prove at least that lanolin possesses no superiority over lard in promoting the absorption of potassium iodide or salicylic acid through the skin.

Alligator Oil.

Pharmaceutists who are also analysts may be interested to know that alligator oil has recently been introduced into commerce for currying leather. Three varieties are met with, one which is pure alligator oil, another, which is known as crocodile oil, and a third, which appears to be a mixture of the two. The alligator oil is stated to be unctuous, semifluid, of a reddish colour, and of specific gravity 0·928, and to consist chiefly of 60·21 per cent. of olein and 32·31 of margarin and stearin, 1·50 of free oleic acid and 0·02 of iodine. Crocodile oil is of a reddish colour, but

more fluid than alligator oil. The alligator oil is preferred by curriers, as it gives more weight to the leather than either whale, cod or seal oil. It is valued at 1 franc per kilogram.

Methylic Ether.

In one of the "opuscula practica" of the last part of *Asclepiad* (p. 135), Dr. Richardson recalls some results obtained by him twenty years since when experimenting as to the anæsthetic properties of methylic ether. In twenty-seven cases the gas was found to produce sufficient insensibility to allow of the operation of tooth-extraction without pain, recovery to consciousness being very rapid. It was noticed that whilst the patients under its influence were rendered insusceptible to pain, they retained sufficient consciousness to respond to requests made of them and even to converse. It also proved to be a very safe anæsthetic. Inconveniences in manipulation led to methylic ether being set on one side for a time, but Dr. Richardson thinks that as methods of condensing gases have been recently so much improved, it may yet be possible to bring this gas into useful service as an anæsthetic.

Syrupus Ferri Superphosphatis Oxygenatæ.

Another of the "opuscula" is devoted to the perfected form of a ferruginous preparation, which Dr. Richardson has found a useful remedy in cases of a neuræsthenic type, especially when anæmia is present, and which he entitles somewhat variously as "syrup of superphosphate of iron and oxygen," "syrupus ferri superphosphatis oxygenatis," and "superoxygenated superphosphate of iron." It consists of a mixture in equal parts of "syrup of superphosphate of iron," solution of peroxide of hydrogen (10 volume strength) and pure glycerine, and the dose for an adult is from one to two fluid drachms two or three times a day in three ounces of water. It is mentioned that it has been observed by Mr. Robbins that if the peroxide of hydrogen be added in excess to the syrup and glycerine be not used, the product is of a beautiful red colour, which, however, is unstable. Made according to the improved formula it is described as very stable, of an agreeable taste, and as capable of being prescribed with tincture of nux vomica, strychnine, morphine, codeine, quinine, salicin, or any other compound that does not liberate the oxygen from the peroxide.

Solutions of Corrosive Sublimate.

When ordinary water is used, in the absence of distilled water, in the preparation of antiseptic solutions of mercuric chloride, an insoluble mercurial precipitate is gradually formed, which according to Herr Feuerbringer is a trioxychloride or tetraoxychloride, due to a reaction between the mercuric chloride and the carbonates of the alkaline earths present in the water. In order to prevent this precipitate the addition of acid has been recommended. But Herr Schillinger has pointed out (*Texas Druggist*, May, p. 58, from *D. Med.-Zeit.*), that the formation of the precipitate does not take place for a considerable time if an equal quantity of sodium chloride be added, and some elaborate experiments by Dr. Emmerich appear to show that this combination of sodium chloride with mercuric chloride does not in the least affect the antiseptic qualities of the latter. It is also stated that pastilles containing equal and definite quantities of the two chlorides have been prepared for this purpose and are used in the Munich clinic.

Yerba Santa and Quinine.

A syrup prepared from *Eriodictyon Californicum* leaves, or "yerba santa," is used largely in the United States for the administration of quinine, the bitter taste of which it suppresses. According to Mr. Rother (*Amer. Journ. Pharm.*, May, p. 225) this property is due to the presence in the leaves of an acid resin that forms with some bases very soluble salts, which react with quinine salts to form an ordinarily insoluble quinine resin-acid salt. This compound is readily decomposed by the stronger acids, and is peculiarly soluble in ammonia.

Antipyrin as an Anodyne.

Antipyrin has hitherto been chiefly used as an antipyretic, but M. Germain Sée points out that it also possesses remarkable anodyne properties (*Compt. Rend.*, civ., 1085). This has been proved in cases of migraine, neuralgia, muscular rheumatism, locomotor ataxy, lumbago, sciatica, cardiac and other painful diseases. M. Sée remarks that it is superior to antifebrin for this purpose, since the dose of antifebrin that would produce the same anodyne result gives rise, if great care be not taken, to serious symptoms, so that it cannot be used with safety. The only inconvenience experienced from the long-continued use of antipyrin, or from an over dose, is the production of a rash resembling nettle rash or scarlatina, but this disappears if the dose is lessened. Antipyrin has also been employed as a hæmostatic by Dr. Goets, of Geneva, in bleeding at the nose in a case of purpura hæmorrhagica, and it has also been applied locally for the same purpose in other diseases.

Veratrum Alkaloids.

About four years since (*Pharm. Journ.*, [3], xiii., 799) it was pointed out by Herr Bosetti that commercial "veratrine," corresponding with the official preparation of the German and British Pharmacopœias, was a mixture of two probably isomeric alkaloids, one of which was crystalline and insoluble in water ("cevadine" of Wright and Luff) and the other non-crystalline and soluble in water ("veratridine" or "soluble veratrine"). The question might therefore arise whether these two constituents are equal in medicinal value, so that the results of some comparative experiments made by Herr Lissauer with the amorphous official veratrine as a preliminary to an investigation as to the physiological action of the crystalline alkaloid have a bearing upon the relative therapeutic value of that mixture (*Arch. f. exp. Path. u. Pharm.*, xxiii., 38). It was found that when injected into frogs the crystalline and the official veratrine corresponded in their action qualitatively and quantitatively. In respect to mammalia the experiments were not sufficiently numerous to allow of judgment being pronounced quite so decidedly, but the results gave no reason to suppose that there is any essential difference between the physiological action of the two preparations.

Strychnine in St. Ignatius Bark.

In a communication to the *China Mail* (March 31), Mr. W. E. Crow, of the Government Laboratory, Hong Kong, announces that he has found abundant evidence of the presence of both strychnine and brucine in the bark of *Strychnos Ignatii*, Berg., the St. Ignatius's bean tree. According to 'Pharmacographia,' the seeds contain about 1·5 per cent. of strychnine and 0·5 per cent. of brucine, but the bark is not known to have been previously analysed. The tree does not appear to be indigenous to China

proper, though its seeds are a well-known article of materia medica. The material examined by Mr. Crow was obtained from the Philippines.

Amyrin.

The principal crystallizable constituent of elemi resin, to which the name "amyrin" has been given, has been variously described by different chemists. Buri, one of the latest investigators, has represented it as a monovalent alcohol, with a melting point at 177° C., and corresponding in composition to the formula $C_{25}H_{42}O$ (*Pharm. Journ.*, [3], vii., 157). In re-examining Buri's compound and by careful and repeated recrystallization, Herr Vesterberg found it was possible to separate it into distinct portions, one consisting of dense aggregates of united prisms, and the other of light thin lamels (*Berichte*, xx., 1242). These were found to represent two distinct but isomeric monovalent alcohols, which have been named α-amyrin and β-amyrin, and are represented by the formula $C_{30}H_{49}OH$. α-Amyrin was eventually obtained in long, fine needles, fairly soluble in hot alcohol, but with difficulty in cold alcohol, having a melting point about 180–181° C., and yielding an acetyl derivative that melted at 220° C. β-Amyrin melted at 193–194° C., and gave derivatives that were more difficultly soluble and had higher melting points than the corresponding derivatives of α-amyrin. Both the amyrins rotated the plane of polarized light to the right.

Hop Bitter.

The bitter principle of the hop has for centuries entered so largely into the dietary of the human race, that it is not a little astonishing to realize that so little is known respecting its true nature and properties. Until quite recently there has been a choice of conflicting statements as to the identity of the compound, but about a year ago (*Pharm. Journ.*, [3], xvi., 1085) Herr Bungener to some extent reconciled them by announcing that the bitter principle as it exists in the hop is a crystalline acid, insoluble in water, which readily undergoes oxidation, and then becomes to some extent soluble. The physiological action of this bitter has now been investigated by Dr. Dreser (*Arch. f. exp. Path. u. Pharm.*, xxiii., 129), and he reports that the unaltered acid in alcoholic solution is a powerful poison, 0·25 milligram being fatal to a large frog, and 20 to 25 milligrams to a guinea pig. In frogs it produces paralysis of the central nervous system and of the heart, but in warm-blooded animals the action is in the direction of an intense accleration of the respiration. However, it may be comforting for beer drinkers to learn that in its altered condition, which it is sure to attain before the beverage containing it reaches its ultimate destination, the hop bitter is almost devoid of these noxious properties. In the words of Dr. Dreser, "the hop-bitter occurring in beer is consequently, on account of its harmlessness, quite an uninteresting substance from a toxicological point of view."

Diastase.

Chemists seem to experience considerable difficulty in arriving at an agreement respecting the nature of diastase, its claim to an albuminoid character being especially the subject of dispute. Herr Hirscheld has attempted to solve the problem (*Arch. f. gesammte Phys.*, xxxix., 499) by examining a "pure diastase," prepared by macerating coarsely powdered malt with an equal weight of one per cent. solution of neutral acetate of lead, afterwards diluting with an equal quantity of water, straining and precipitating the red-brown liquid with alcohol, redissolving the precipitate in water at 50° C., cooling and again precipitating. The diastase so obtained is said to be very active, to contain no sugar or reducing substance, and to give no colour with Millon's reagent. Considering these properties and the published analyses of Zulkowsky, according to which the nitrogen diminishes in proportion to the purity of the ferment, Herr Hirscheld holds that diastase is a carbohydrate, a kind of gum, and that any nitrogen found in it has its origin in impurities. On the other hand, working with diastase obtained by treating malt with water and precipitating with alcohol, the precipitate being redissolved and reprecipitated several times, Herr Lintner has arrived at diametrically opposite results (*Journ. f. prakt. Ch.*, xxxiv., 378). He found that the more pure and more active the diastase the more nitrogen it contained, but that the proportion never exceeded 10·42 per cent., and he therefore concludes that diastase is a proteid, probably an oxidation product of albuminoid matters.

Carotine in Leaves.

It has been recognized that the red colouring matter contained in leaves is a hydrocarbon possessing the physical and chemical properties of carotine, the orange-red crystalline compound obtainable from carrots. Some further observations by M. Arnaud (*Compt. Rend.*, civ., 1293) led him to the conclusion that carotine is a constant and normal product of vegetable life; that in fact it is frequently present in the largest proportion in the leaves of the most vigorous plants, and consequently those that are the most intensely green, its presence being then masked by the green of the chlorophyll. This has been confirmed by some experiments in which leaves carefully dried in a vacuum were exhausted with light petroleum spirit, the residue from evaporation redissolved in carbon bisulphide, and the solution examined colorimetrically. It was estimated in this way that the leaves of *Spinacia oleracea* contain carotine equal to 79·5 milligrams in 100 grams of the dry material; leaves of *Urtica dioica* 95 milligrams, and leaves of various grasses 71 milligrams. This quantity of red colouring matter would appear to be sufficient to modify considerably the colour that would be due to chlorophyll alone.

Chlorophyll as a Dye.

The green colouring matter of leaves is so important a factor in the beauties of nature, that it is not surprising attention should have been turned to it as a possible dyeing material, but hitherto little success has attended experiments in this direction. In a paper recently read before the Manchester Section of the Society of Chemical Industry, Dr. Schunck described some of the difficulties that have been met with in applying chlorophyll as a dye. The first is the extremely fugitive nature of the colour, a solution on exposure to light for a day or two becoming quite bleached. Another is that since chlorophyll is rather basic than acid in its properties, ordinary mordants exercise no action on it. Even the yellowish-green "acid chlorophyll," which is formed upon the addition of acid to a solution of chlorophyll, although much more stable, is not susceptible to the action of mordants. But chlorophyll forms double compounds with certain metallic salts, and one of these, a beautiful green compound that is formed when a small quantity of copper oxide is added to an acetic acid solution of chlorophyll,

readily dyes fabrics that have been previously treated with albumen or gelatin, or substances that normally contain gelatin. The fibre of cotton presents only a very slight attraction for this compound, that of silk a little more, and woollen fibre most of the three.

Colouring Matter of Lac Dye.

Notwithstanding the pigment secreted by the lac insect has long been used as a dye, very little is known as to the exact method of its preparation, and still less as to its composition. The subject has been taken up by Herr R. E. Schmidt, who reports that the actual colouring principle is a crystallizable body having acid properties, which is closely allied to carminic acid, the colouring principle of cochineal, and for which the name "laccainic acid" is proposed (*Berichte*, xx., 1285). It was obtained as a brownish red crystalline powder or as a darker crystalline crust, appearing under the microscope to consist of well-formed rhombic tables, of a yellow-red colour. Laccainic acid is described as being abundantly, though slowly, soluble in alcohol; freely soluble in wood spirit, amylic alcohol, aceton and glacial acetic acid; somewhat less soluble in water, giving it a blood-red colour, and insoluble in ligroin and benzol. It is nearly insoluble in ether, but is not precipitated by ether from an alcoholic solution, in which behaviour it resembles the colouring principle of cochineal. Towards bases it behaves as a tolerably strong acid, though well-defined salts are not easily prepared. In none of its reactions does it markedly differ from carminic acid, which it resembles also in its absorption spectrum, so that it might be supposed the two bodies were identical. But this seems to be precluded by the results of analysis, which indicate that the composition of laccainic acid could be represented by the formula $C_{16}H_{12}O_8$, whilst all the different formulæ that have been attributed to carminic acid represent that compound as containing considerably less carbon. Herr Schmidt, however, calls attention to the remarkable nearness of this formula, especially in the number of carbon compounds, to those attributed to several other colouring compounds; for instance, brasilein ($C_{16}H_{12}O_5$), hæmatein ($C_{16}H_{12}O_6$), crocin, from saffron ($C_{16}H_{18}O_6$), and two derivatives from carminic acid, rufococcin ($C_{16}H_{10}O_6$) and ruficarmin ($C_{16}H_{12}O_6$). Some samples of lac dye examined proved to contain only from 10 to 13 per cent. of the colouring principle. With respect to the method of preparing the lac, consideration of the ash points, in Herr Schmidt's opinion, to a precipitation by lime, to which some alumina has been added to facilitate the washing of the precipitate and make it more convenient for working up.

Substitute for Gum Arabic.

A substitute for gum arabic, which has been patented in Germany, and is likely to be largely used for technical purposes now that good gum arabic is so scarce, is made as follows, according to the *American Druggist* (May, p. 94):—Twenty parts of powdered sugar are boiled with 7 parts of fresh milk, and this is then mixed with 50 parts of a 36 per cent. solution of silicate of sodium, the mixture being then cooled to 122° F. and poured into tin boxes, where granular masses will gradually separate out which look very much like pieces of gum arabic. This artificial gum copiously and instantly reduces Fehling's solution, so that if mixed with powdered gum arabic as an adulterant its presence could be easily detected. The presence of silicate of sodium in the ash would also confirm the presence of adulteration.

Several abstracts of theses by graduates of pharmacy, given this month in the *American Journal of Pharmacy* (pp. 228, 230), include the results obtained from the examination of some indigenous American medicinal plants. Of these, *Mitchella repens*, L., was found to contain a neutral principle precipitated by tannin and picric acid, but which did not possess the properties of either alkaloid or glucoside, and a saponin-like principle precipitated by baryta and frothing in aqueous solution. *Leptandra virginica* yielded a bitter principle in crystals of a pale lemon-yellow colour, agreeable odour and very bitter taste. This did not yield glucose on boiling with dilute sulphuric acid, and was not precipitated by tannin or Mayer's solution; it was soluble in alcohol, ether, benzol, less freely so in water, and insoluble in petroleum benzin. The seeds of *Catalpa bignonioides* were found to contain resin, fixed oil and tannin, and a crystalline body, deposited in the form of needles from an ethereal solution, which was soluble also in alcohol and chloroform, but insoluble in water, almost tasteless, and did not reduce Fehling's solution. *Ilex opaca* yielded a volatile body of an acrid mustard-like odour, a resin, tannin, and apparently a glucoside. The seeds of *Gymnocladus canadensis* afforded about 10 per cent. of fixed oil, a little wax, fat and resin, and a small quantity of a glucoside, soluble in water and chloroform, and having a peculiar odour and a burning taste.

Mitchella repens

Leptandra virginica

Catalpa bignonioides.

Ilex opaca.

Gymnocladus canadensis.

A curious fact in connection with the production of bicarbonate of sodium has been observed by M. Paul de Mondésir (*Comptes Rendus*, civ., p. 1102). He finds that when carbonate of sodium is mixed with a single equivalent of water, it does not absorb carbonic acid at ordinary temperatures, or if it does, the absorption takes place with extreme slowness. But when it is mixed with a small proportion of dry bicarbonate the reaction commences forthwith and is continued with an energy in proportion to the amount of bicarbonate and the care with which the mixture is made.

Sodium Bicarbonate.

At the Pharmaceutical Meeting held in Philadelphia on April 19, Professor Maisch directed attention to a new species of *Strophanthus*, discovered near the Congo river, and which is now being cultivated in the Botanical Gardens at Breslau. The seeds are furnished with an awn that is feathery from base to apex. The seeds are poisonous, but it has not been ascertained whether the active principle is strophanthin. The flowers are much larger than those of *Strophanthus hispidus*, and the corolla lobes are much longer. It is figured in a recent number of the *Garten Zeitung*.

New Species of Strophanthus

Dr. T. F. Hanausek publishes in the *Pharmaceutische Post* an account of the anatomical structure of strophanthus seed. Although by the aid of the microscope strophanthus seeds may be distinguished from seeds of other genera, it is somewhat doubtful, according to Mr. Kirkby, who has examined several kinds of the seeds, whether any markedly distinc-

Strophanthus Seed.

tive microscopical characters occur by which the seeds of one species might be readily distinguished from another. The hairs of the seed are swollen at the base something like those of the nux vomica seed. Dr. Hanausek considers that the reactions given with the seed by liquor potassæ and sulphuric acid are characteristic. With the former a transverse section of the seed shows the testa as a golden-brown line, the albumen colourless, and the embryo of a greenish-canary-yellow. With concentrated sulphuric acid a fresh section of the seed shows the testa and hairs of a golden-brown colour, the albumen verdigris-green, then emerald-green, and the embryo first yellow, then greenish-bronze-coloured, then copper-coloured, and finally, after one or two minutes, garnet-red or even blood-red. These observations refer to the Kombé seed of commerce, or greenish-brown seed. It is stated by Mr. Lindsay, the Curator of the Botanical Garden at Edinburgh, that this seed has produced plants identical in appearance with those obtained from the seed used by Professor Fraser, but there is reason to suppose that this seed is derived from two species. Mr. Christy, in a very useful *résumé* of the available information concerning strophanthus in 'New Commercial Plants,' No. 10, mentions that from three seeds sown and apparently of the same species, two plants came up having smooth and the other hairy leaves. Mr. Lindsay also states that two different seedlings came up from some of the greenish-brown seed recently sown by him.

Adulterated Aniseed.

It is well known that conium fruits bear a strong resemblance to those of anise, and that they sometimes occur mixed with them ('Pharmacographia,' p. 312), but hitherto the regular admixture of the two fruits does not appear to have been recorded. Mr. C. L. Lochman, however, states in the *American Druggist* (May, p. 81) that in every case in which he has planted Italian aniseed conium has come up mixed with it, although such has not been the case when German aniseed was planted. From examination under a lens, as well as from his experiments in planting, he concludes that Italian aniseed contains as a rule 2·5 per cent., if not more, of conium fruits. Mr. Lochman believes that the admixture probably arises from the fact that conium, like henbane, sometimes flowers and fruits the first year, and is thus overlooked. Under a good lens conium fruit, which closely resembles aniseed in colour,* may be easily recognized by being glabrous and covered between the ridges with minute wrinkles. Aniseed, on the contrary, is covered with minute hairs. The Maltese, Italian, and Alicant aniseeds are larger than conium, but this feature is not readily noticeable by the naked eye when the two are mixed, in consequence of the similarity of colour. Under the microscope a section of the two seeds is very different, owing to the fact that conium, when mature, has no vittæ, while aniseed presents nearly thirty.

Jequirity seeds.

The seeds of *Abrus precatorius* have recently been examined by Dr. S. Martin, and in a paper by him, read before the Royal Society on May 5, it is stated that he found the saline extract of the seeds to contain a globulin identical with that occurring in papaw juice, and belonging to the group of vegetable paraglobulins; also, an albumose identical with the α-phyt-albumose of the papaw juice, described by the author. Dr. Martin also pointed out that the vegetable paraglobulins differ from the myosins in the fact that the latter readily become changed into albuminate when the sodium chloride holding them in solution has been dialysed away (*Nature*, May 19, p. 70).

* Russian aniseed resembles conium in size, but is of a much darker tint.

Eschscholtzia californica.

M. Stanislas Martin has lately directed attention (*L'Union Pharmaceutique*, May, p. 197) to the sedative properties of *Eschscholtzia californica*. He believes that a medical and chemical examination of the plant would prove interesting, and is willing to place the material which he possesses at the disposal of any one who will undertake the examination. The plant is so common in gardens, that it could be easily obtained in quantity during the summer months.

Fabiana imbricata.

Fabiana imbricata, the Chilian plant that was introduced to the notice of the medical profession some months ago, blossoms at this time of year. It is hardy out of doors in the South of England, and forms in less-favoured localities a pretty greenhouse shrub. Although it belongs to the Solanaceæ it has a remarkably heath-like habit, and racemose flowers resembling a heath but of a pure white colour. It remains in flower for a considerable time (*Garden*, p. 474, May 21).

Vaccinium intermedium.

At a meeting of the Linnean Society on May 5, Mr. N. E. Brown read a paper on *Vaccinium intermedium* as a native of Britain. The plant was discovered at Cannock Chase, by Professor Bonney, growing with *V. Myrtillus* and *V. Vitis-Idœa*; it is regarded by Mr. Brown as a hybrid between these two, originated independently at Cannock Chase, and not introduced from the continent.

Sheaths of Algæ.

Some important observations have recently been made on the substance of which the sheath that invests the filaments of some algæ is composed. Herr G. Klebs maintains that it is not formed from the cell-wall, but from the contents of the cell, through the cell-wall. The sheath substance differs from the ordinary mucilage in not being dissolved by alkalies (*Nature*, May 5, p. 15).

Root-Buds.

One of the distinctions between roots and stems was formerly stated to be the appearance of leaf-buds on the latter and their absence from the former. The *Gardeners' Chronicle* (p. 583) illustrates the formation of leaf-buds on the fibrous roots of a fern (*Diplazium malabaricum*) and suggests that it will ultimately be found that buds and sporangia of all kinds are variants from a common type.

Euphorbiaceous Root Barks.

Mr. E. Schmidt, continuing his examination of the barks of the roots of the Euphorbiaceæ, in the present number of the *Répertoire de Pharmacie* (p. 237) points out that the bark of *E. Esula* is distinguishable from that of the nearly allied *E. Cyparissias* by the characters afforded by the woody zone. In the former it is formed of four large fibrovascular bundles separated by wide medullary rays. In *E. Cyparissias* the fibrovascular bundles are narrower and more numerous, and the number of medullary rays is consequently greater. The root bark of *E. Cyparissias* is an emeto-cathartic in doses of ·60 to 1 gram.

In a note in the *Gardeners' Chronicle* of May 21, Mr. A. Gordon states that at Colchester the Japanese peppermint plant has proved perfectly hardy, and that it produced seed last year. If the present low price of menthol continues, the plant will hardly repay the expense of cultivation.

Japanese Peppermint.

Those who take an interest in the cultivation of medicinal plants will find some interesting notes on the subject, by Mr. Lewis Castle, in Christy's 'New Commercial Plants.' As Mr. Castle is on the staff of the *Journal of Horticulture*, his remarks on the best methods of cultivating these plants are worthy of attention. Among those which have not yet been cultivated on a commercial scale in England, he mentions *Cimicifuga racemosa*, *Citrullus colocynthis*, *Hydrastis canadensis*, *Podophyllum*, *Spigelia marilandica* and *Veratrum album*.

Cultivation of Medicinal Plants.

A piece of amber, said to be the largest ever discovered, and weighing 850 grams, was recently dug up near the Nobis Gate, at Altona (*Nature*, May 19, p. 63).

Amber.

QUININE TESTING.*

BY DR. O. HESSE.

The subject of quinine testing has recently been made prominent by the circumstance that the long-known presence of cinchonidine sulphate in commercial quinine sulphate has been again discovered by De Vrij, and an importance has been attached by him to his discovery which it does not possess, and probably will never acquire. But the vehement outcry raised by De Vrij as to this fact, supported by the incorrect results he had obtained by the optical method of testing, has at least had the effect of directing more critical attention to the test of the German Pharmacopœia, the defects of which I had previously pointed out. Though Vulpius some weeks ago expressed the opinion that the problem in question had been solved by means of Schäfer's oxalate test, it is evident from the fact of Schäfer having very soon supplemented that test by the tetra-sulphate test, which was represented as giving better results than the oxalate test, that it was not altogether free from defect.

In this position of the matter, and in order to satisfy the demands made upon me, it appeared appropriate that I should take up the discussion. But before entering more in detail upon the subject of quinine testing I think it desirable that I should endeavour to answer the question as to what admixtures of alkaloids may be expected to obtain in the manufacture of quinine sulphate, and to inquire to what extent there may be any justification for the assertions of De Vrij that the therapeutic value of quinine sulphate is reduced by the presence in it of these possible admixtures.

Chemically pure quinine sulphate, free even from hydroquinine, crystallizes in heavy needles, according to my observation. By means of certain mechanical devices it may indeed be obtained in a somewhat lighter form, but not of such a light flocculent character as the sulphate usually prepared and answering to the test of the German Pharmacopœia. The light character of the latter is therefore due to some other circumstance, and especially to the presence of small admixtures of the sulphates of hydroquinine and cinchonidine, possibly also of hydrocinchonidine and homocinchonidine. The sulphates belonging to the cinchonidine group can be separated from quinine sulphate without interfering with its light form when it happens that there is a sufficient amount of hydroquinine present.

Quinine sulphate does not assume the light character in question as a result of the presence of quinidine or cinchonine sulphates; moreover it has not the least tendency to crystallize together with either of these salts. It is true, Jungfleisch states that quinine sulphate made from cuprea bark contains quinidine, which separates in crystals when such quinine sulphate is subjected to my test, but so far as my observation goes this statement is not supported by experiment.

Leaving out of consideration for the moment hydroquinine—which, as I shall show in a subsequent paper, approximates very closely indeed to quinine in its chemical nature—as well as the traces of hydrocinchonidine and homocinchonidine that are now and then met with in normal quinine sulphate, cinchonidine is the only adventitious alkaloid that has to be taken into account as being not unfrequently present in large amount in the bark from which quinine sulphate is manufactured. The Ceylon bark which is now so abundant in the market is for the most part especially rich in this alkaloid. But notwithstanding this disadvantage it is still the case that in the old-established quinine factories quinine sulphate that contains only a very small amount of cinchonidine sulphate is made from this bark.

It may indeed be safely assumed that formerly, when the method of manufacture was less perfect than it is at present, quinine sulphate contained a much larger proportion of cinchonidine, although the bark then employed for the purpose generally contained a smaller amount of cinchonidine than at the present time. But even then the amount of cinchonidine was limited by the prescribed method of testing. So far as I am aware, Liebig's test was then most in use, and, as I have shown in another place, it indicates the presence of cinchonidine only when amounting to more than 10 per cent. I, therefore, consider it very probable—and in this respect I agree fully with De Vrij's opinion—that in his time the therapeutic value of quinine sulphate was ascertained with a salt that contained cinchonidine, and contained at least several per cent. It is, however, now known that cinchonidine acts in the same manner as quinine if only with one-fourth the potency. If this relation be considered, it must also be admitted that a diminution of the therapeutic value of quinine sulphate due to the presence of a few hundredths of cinchonidine sulphate could not be appreciably expressed in figures at all. Consequently in the case now under consideration it is not with therapeutic value that we have to do, but it is only the pecuniary question that has perhaps to be taken into account.

This latter consideration, combined with the circumstance that formerly cinchonidine was not separated from quinine at all, was in fact the reason for De Vrij's suggestion that the two alkaloids should not be separated, and, indeed that none of the cinchona alkaloids should be thus separated. As is well known, this opinion led to the discovery of "quinetum." It is true De Vrij defined the idea of quinetum as representing a constant mixture of the alkaloids obtainable from the bark of *Cinchona succirubra* that would always give a rotation equal to $(\alpha)j = -38°$, though in reality it is a "mischmasch" of alkaloids, such as the bark may happen to furnish, and though it is lævogyre, it is not uniformly so. Besides this, the compound of part of such a "mischmasch" of alkaloids with sulphuric acid is prepared and brought into the market as "quinetum sulphuricum." While quinetum itself is a yellow or yellowish-white powder, quinetum sulphuricum is in the form of delicate white needles, and by reason of its great resemblance to quinine sulphate, it is well adapted for the adulteration of that article. This is the preparation that De Vrij on another occasion, in 1877, proposed should replace quinine. It is true that this proposed substitution was, as it appears, to apply only to the case of half-civilized people. To judge from the remarks made by Vulpius in reference to this preparation, it may be inferred that he is not acquainted with its nature, and, therefore, I will give here the results of some analyses of it.

* From the *Pharmaceutische Zeitung*.

Quinetum.	1875. Hesse. Per cent.	1879. Oudemans. Per cent.
Quinine	14·96	6·1
Cinchonidine	35·29	22·9
Cinchonine	21·08	37·0
Quinamine	trace	4·5
Amorphous alkaloid	21·06	21·2
Sodium carbonate	—	2·9
Sulphuric acid	1·21	—
Water	6·01	2·7

Quinetum Sulphuricum.

	1875. Hesse. Per cent.	1876. Hesse. Per cent.
Quinine sulphate	14·14	11·91
Cinchonidine sulphate	62·92	61·17
Cinchonine „	22·94	26·92

In another sample of quinetum, Oudemans found only 1·1 per cent. quinamine, but 0·3 per cent. quinidamine and 0·5 per cent. quinidine.

From the foregoing remarks it will be seen that quinine, which chiefly determines the medicinal value of cinchona bark, is present in the preparation called quinetum only in small amount, and that the quinetum sulphuricum which was represented as being directly comparable with quinine sulphate contains no less than about 87 per cent. of the associated alkaloids, and among them about 63 per cent. of cinchonidine sulphate. Closely approximating in character to this latter preparation is the quinine sulphate the English Government prepared in their factories in India, containing, according to the data published by Hooper, 40·88 cinchonidine sulphate and 59·12 quinine sulphate, or as Hooper calculates, 37·55 cinchonidine sulphate and 62·45 quinine sulphate. All this meets with approval from De Vrij.

It is therefore inexplicable to find De Vrij contending that quinine sulphate is depreciated in its therapeutic value by the presence of a small percentage of cinchonidine sulphate, and that for this reason it must be prepared absolutely free from cinchonidine. In any case such an assertion by De Vrij is unjustifiable so long as he continues to maintain the opposite view as to the abovementioned preparations and warmly advocates their use.

I completely agree with Vulpius in the opinion that a preparation sent out as quinine sulphate and to be used as such ought to contain only a moderate proportion of the associated alkaloids, and it is upon this very ground that I raised objections to the test given in the first issue of the German Pharmacopœia. Subsequently I pointed out how the least trace of cinchonidine could be detected with certainty in quinine sulphate. On the basis of my long experience of this subject I proposed to the Pharmacopœia Commission in 1882 not only a test which would without difficulty admit of the detection of a small admixture of cinchonidine sulphate, but also sent a report that was read by the late Professor Fehling at a meeting of the Commission, in which I fully discussed the whole subject, and pointed out the defects of the test in the Pharmacopœia. Notwithstanding this, only Professors Fehling and Otto were in favour of my test being adopted, all the other members prefering to adopt Kerner's test on the recommendation of Professor Flückiger, although I had shown in my report that with quinine sulphate that is not effloresced, or only partially so, a large portion of the cinchonidine sulphate present would escape detection by that test.

In reply to the objection raised by Vulpius to my proposed test, that I desired to pass a less pure quinine sulphate than the Pharmacopœia and the German pharmacists required, I can therefore refer to these facts as proving that his opinion in that respect is entirely unfounded.

The test proposed by me was as follows :—

Take 1 gram of the quinine sulphate dried at 100° C., shake it with 20 c.c. of water at 60° C., filter after cooling, and place 5 c.c. of the filtrate in a narrow test tube with 5 c.c. of ether and 5 drops of ammonia solution ; close the tube and shake the mixture. The clear ether solution thus obtained should not afterwards deposit crystals. The settlement of the point as to the time to be allowed for such a deposit to take place I left to the Commission ; also the decision whether quinine sulphate with two or more per cent. of cinchonidine salt was to be passed.

It will be seen that this test was very similar to that I had previously recommended ; it was simply an improvement upon that by which I had done away with defects of which I had become aware by long experience.

The principle on which this test is based is the fact, unfortunately still insufficiently known, that the compound of cinchonidine sulphate with quinine sulphate is decomposed at 100° C., and in a certain way disintegrated, so that the whole of the cinchonidine sulphate present is acted upon and dissolved by the water used. Although in contact with water a partial combination of the associated sulphates may be induced, by far the greater part of the cinchonidine sulphate passes into solution, while the quinine salt remains almost entirely undissolved. If it were possible to leave the quinine salt completely undissolved there would be no reason to fear any loss of cinchonidine sulphate, but some of the quinine sulphate is dissolved at 60° C., and thus opportunity is afforded for a small portion of the dissolved cinchonidine salt to form a certain quantity of a double compound, which is afterwards deposited in amount corresponding to its solubility. Thus it happens that the whole of the cinchonidine is not obtained in solution in such an experiment. But in any case such a mode of extraction is more complete than when the sulphate is boiled with water, or dissolved in boiling water, since in the latter case there will be not only a decomposition of quinine sulphate attended with elimination of quinine (which can be extracted by benzol), but since greater part, and perhaps the whole of the quinine sulphate will then pass into solution, a larger portion of the cinchonidine sulphate will again become latent from formation of the double salt when crystallization takes place. For this reason I cannot approve of the modification in my original test which Schäfer suggested, nor can I confirm the condemnation that he pronounces upon all tests which do not involve a complete solution of the whole of the quinine sulphate during the operation, though I admit that by complete solution of the material tested mixed crystallizations may be placed on the same level as artificial mixtures. This latter result may, however, be obtained simply by allowing the mixture to effloresce at a moderate temperature.

In reference to the other tests that have recently been proposed that of Kremel may be mentioned as very delicate, but like other titration methods it has the disadvantage that it must necessarily be assumed that the substance examined actually contains the constituent that is to be determined by the operation. This condition cannot be ensured in the case now under consideration, consequently that method of testing is inapplicable quite independently of the circumstance that when the commercial quinine sulphate containing cinchonidine sulphate is heated with hot water, as Kremel directs, a solution is not unfrequently obtained on cooling which does not contain the sulphates in question in the same proportions as water solutions of each of them separately would do.

The bisulphate test recommended by De Vrij has a sounder foundation, and it yields very good results when it is carried out with the modifications I have suggested. It requires, however, the use of very pure ether, as is indeed the case with every form of cinchonidine determination that is carried out with ether. The modification of this test introduced by Schäfer is less to be relied upon, probably because the evaporation of the ether solution is attended with such a concentration of the quinine as to have the effect of hindering the crystallization of the alkaloid or its compound. It may be for this reason

that Schäfer was unable to obtain crystals of "cinchonidine" in operating upon quinine sulphate known to contain 2 per cent. of cinchonidine sulphate. I have no hesitation in affirming that the crystals obtained by the bisulphate test as modified by Schäfer and described by him as "pure cinchonidine" are a compound of quinine with two molecules of cinchonidine. As I have shown on another occasion, this bisulphate method always gives a cinchonidine result that is too high in the case of a sample containing only a small amount, and with one containing a larger amount the result obtained is too low. On the whole, however, the results obtained by this test are very satisfactory, and they are obtained with one operation, while the recrystallization test recommended by Dr. Paul appears to require several successive operations.

It is well known that Paul was the first to direct attention to the occasionally considerable amount of cinchonidine sulphate in the quinine sulphate of commerce. His method of ascertaining the amount of this impurity consists in dissolving 5 grams of the salt in question in 150 c.c. of boiling water and after cooling the solution treating the mother-liquor thus obtained with ammonia and ether. The recrystallized sulphate is to be again treated with 100 c.c. of boiling water, and the mother-liquor obtained after cooling subjected to treatment with ammonia and ether, this operation being repeated until no more crystals are deposited from the ether solution thus obtained. These crystals, however, are not pure cinchonidine, but the compound already mentioned. Consequently the amount of cinchonidine indicated by weighing them is too high by the amount of quinine they contain. If the mother-liquors were treated with ether direct this surplus would be to some extent reduced by the circumstance that it would not then be possible to obtain the whole of the cinchonidine in a state for weighing. But if the mother-liquors are concentrated by evaporation so as to allow of less ether being used, satisfactory results are readily obtained. The mode of procedure I adopt in applying this test is to dissolve 5 grams of the sulphate in question in 150 c.c. of boiling water, and after the cooled solution has crystallized the mother-liquor is separated by filtering with the aid of suction. The partially-dried residue left on the filter is then boiled with another 120 c.c. of water, and this operation is repeated as often as may be necessary for removing the whole of the cinchonidine. In the case of a salt containing 5 per cent. cinchonidine sulphate at least three such operations will be requisite, and a salt containing 9 per cent. will require at least five recrystallizations. The mother-liquors obtained in the first three operations are then mixed together and evaporated at a moderate heat almost to dryness; the saline residue is dissolved by a few drops of dilute sulphuric acid, and the solution, made up to the volume of 20 c.c. by addition of water and ammonia solution, is shaken with 16 c.c. of ether. After the lapse of twenty-four hours the crystals that may have separated from the ether solution are collected and weighed. The mother-liquors from subsequent recrystallizations are evaporated separately to the volume of about 8 c.c., and after being shaken with ammonia and 2 or 3 c.c. of ether they are left at rest for twenty-four hours for the separation of crystals.

For the purpose of comparing the results obtainable by this method of recrystallization and by the bisulphate method of testing the following experimental data are given. No. I. was an old sample of French manufacture, which would not stand the test of the present German Pharmacopœia, and No. II. a sample of German make, which just passed that test, and therefore contained an amount of cinchonidine sulphate that was within the limits allowed.

Bisulphate Test.

	Crystals.	Cinchonidine sulphate. Per cent.
I.	0·534 =	8·94
II.	·302 =	5·09

Recrystallization Test.

	Mother-liquors. 1, 2, 3.	4.	5.	6.	Crystals.	Total.	Cinchonidine sulphate. Per cent.
I.	0·505	0·046	0·007	0	= 0·558	=	9·34
II.	262	·015	·0		·277		4·64

From this comparison it appears that both methods of testing furnish results which agree in a satisfactory manner, and consequently it is optional which mode of testing is applied for ascertaining the amount of cinchonidine sulphate in the quinine sulphate of commerce.

I may mention here that the compound of quinine and cinchonidine obtained in applying the bisulphate test to commercial quinine sulphate will also contain hydroquinine, and probably also in some cases hydrocinchonidine and homocinchonidine in small proportions, so that if the crystals separated were tested for quinine by the optical method it would give results decidedly too low. This is less to be feared with the recrystallization test, because hydroquinine, which has the greatest influence on the result of the optical test, would not be concentrated in the mother-liquors.

De Vrij's bichromate test is quite unsuited for the quantitative determination of cinchonidine, though it admits of its presence being detected when it amounts to only 0·3 per cent. The reason of this is that as the amount of cinchonidine increases, more or less of it is precipitated with the quinine chromate. It is probably on this account that in applying the test to a sulphate containing 2·7 per cent. cinchonidine sulphate, as Schlickum recommends, I did not obtain immediate indications of the presence of cinchonidine, and only a few crystals were formed after the lapse of an hour. The crystals obtained by this test also contain quinine, and are a compound of quinine with seven molecules of cinchonidine.

This is also the case with the oxalate test, and what Schäfer originally took for pure cinchonidine contains quinine, as he has since admitted. The amount appears to be considerable, as I infer from the fact that when dissolved with excess of sulphuric acid the solution has a strong fluorescence, and it becomes intensely green when mixed with chloride of lime and ammonia.

According to the directions for applying this test the precipitate formed on adding soda solution to the filtrate from the quinine oxalate is not to be collected until after twelve hours, and for each 100 c.c. of liquid an addition of 0·04 grm. is to be made to the weight of the precipitate as a correction for the cinchonidine remaining in solution. When the amount of cinchonidine exceeds 4 per cent., the addition is to be 0·066 grm., and the concentration of the solution must be kept to 1 in 50.

Objection has been made from several quarters to this test that too little potassium oxalate is used for precipitating the quinine. But that is not the case, for normal potassium oxalate has only one molecule of water, and with quinine sulphate containing 15 per cent. water 0·42 gram oxalate would be requisite, or with completely effloresced sulphate 0·47 gram.

Another defect of the oxalate test is in the direction as to time. With 60 c.c. of liquid half an hour is not sufficient for obtaining a temperature of 20° C. throughout the whole mass, and this is still more the case with larger quantities. For this reason I have always allowed one hour.

Quinine oxalate is, as Schäfer states, almost insoluble in the presence of potassium oxalate, while cinchonidine oxalate is readily soluble. When a cold saturated solution of quinine oxalate is mixed with the proper quantity of potassium sulphate and an excess of potassium oxalate, the quinine oxalate is at once separated so completely that caustic soda gives no precipitate in the filtrate. On warming the oxalate dissolves, but it separates again completely on cooling. If, however, one per cent. of cinchonidine sulphate be added, and the liquid again

warmed, a very much smaller quantity of quinine oxalate separates on cooling than in the former case, showing that the presence of cinchonidine exercises a solvent influence on the quinine oxalate. It is evident therefore that in operating upon a mixture a certain portion of quinine remains in the mother liquor, and consequently the precipitate produced in such a solution by caustic soda is not pure cinchonidine. Moreover, cinchonidine is precipitated with the quinine oxalate, and in both cases the proportions thus escaping separation appear to be determined by accidental conditions. Hence it is not possible to estimate from the precipitate produced whether the cinchonidine salt amounts to 2 per cent. or only 0·5 per cent. without a quantitative determination.

Assuming that in operating upon quinine sulphate containing 0·5 per cent. cinchonidine salt, the precipitate obtained after twelve hours is 0·001 grm. (it is really rather more) the addition to be made to this for 60 c.c. of solution would be 0·024, and the 2 grm. would accordingly appear to contain 0·025 of pure cinchonidine, or 1·685 per cent of sulphate, at least three times as much as the salt actually contained. A direct experiment under these conditions gave 1·77 per cent. The result is still more unsatisfactory when the amount of cinchonidine salt is larger, and the concentration of one to fifty has to be kept to. In operating with a mixture of 1·875 of quinine sulphate and 0·125 cinchonidine salt, corresponding to 6·25 per cent., the result obtained showed 9·22 per cent., or nearly 3 per cent. more than was really present.

If such known mixtures give differences of this kind, little is to be expected of this test when applied to commercial quinine sulphate, as will be seen from the following results with the sulphate above mentioned (II.), which gave –

	Bisulphate test.	Crystallization test.	Oxalate test.
Cinchonidine sulphate...	5·09	4·64	10·22

Evidently, therefore, the oxalate test is not less defective than the optical test in giving too high an indication of the amount of cinchonidine salt.

It has already been mentioned that the sample II. containing 5·09 per cent. cinchonidine just passed the test given in the second edition of the German Pharmacopœia. With another sample I found that this test passed 7·2 per cent. On a former occasion, in testing according to my optical test a sample which only just passed the test given in the first edition of the German Pharmacopœia, my results in two experiments showed 12·92 and 13·02 per cent. cinchonidine sulphate, which appeared so questionable that I made further experiments with the bisulphate method and the tartrate method (Oudeman's optical test), and found by the former 8·46 per cent., but by the latter 15·7 per cent. cinchonidine sulphate. The cause of this high result—not altogether due to the presence of hydroquinine—was not clearly ascertained, but the experiment gives another illustration of the untrustworthy nature of the tartrate method.

PHARMACY IN INDIA.*

BY J. A. FALCK.

The subject "Pharmacy in India" is probably one which has not been brought before you, and for this reason I am induced to address you, trusting the characteristics of Indian pharmacy will make up any lack of composition by the writer. In the first place there is no pharmacy law in the country, and anyone can engage in the drug business regardless of his knowledge of chemistry. Hence, there are all sorts and conditions of chemist shops from the strictly legitimate shops of Calcutta and Bombay to the native medical halls in the bazaars, where poisons of all sorts are as freely sold as Epsom salts. In Calcutta and Bombay the drug stores are on a line with the pavement as at home, but in other cities and stations of India they, as well as all stores, are built in the centre of yards, or, as called here, compounds, to which there is an entrance and exit gate. The buildings are all one story with very high ceilings, large airy rooms, the store portion to the front and residence part in the rear. Over the entrance to the store a portico is built on account of the great heat of the sun, which would be felt severely by some persons even in the short space of time occupied by leaving the carriage and entering the store. Around the portico are potted plants, rose bushes, etc., and the entrance is, as a rule, bordered with potted plants. Hence, we have no window display, and the part of an apprentice's life, the flies in the window, is unknown here. Outside of Calcutta and Bombay there are no strictly chemist businesses ; but this is an adjunct to a general store, and, as a rule, is the best paying branch of the business. The chemistry part of the business takes the lead in the firm's advertisements, as Root and Co., chemists and general merchants, and this is carried out by merchants whose stock in trade consists of a few auction patent medicines.

The British Pharmacopœia is the standard, but many Indian medicines are prescribed, and there is an Indian Pharmacopœia, which is unofficial. Many American preparations are used, and the United States Pharmacopœia is to be found in every drug store. American patent medicines have a very large sale, and among the non-secret preparations, Parke, Davis and Co's Fluid Extracts and McKesson and Robbins's Capsuled Pills have become best known. The quantity of McKesson and Robbins's Quinine Capsules that are sold is marvellous. Of course, this is a country of fevers and malaria, and the perfections which these capsules have reached have impressed themselves on the medical men, and the natives are among the most frequent buyers. To sell them in bottles of one hundred is of very frequent occurrence. The patent medicine trade is large, but it is much hampered by the natives, who sell at prices that Europeans cannot touch. Most of the goods of the former are auction goods, such as have been on the shelf until the wrappers become unsightly and are then handed over to the auctioneer. Then the native bears the same relation to the European as the Chinaman to the American ; he can live on such a small amount that the profit on one bottle of medicine would keep him in food several days.

Connected with all chemist shops (the term for drug stores) is a manufactory for aërated waters, the sale of which is enormous. Aërated water (carbonic acid water), soda water (with a tinge of bicarbonate of soda), lemonade, gingerade, tonic water (with a trace of quinine), and potash water are those principally bottled. Soda water is kept in bottles of 14 ounces capacity, and the sweetened waters in 12 ounce bottles. The water in India is very bad and many persons never drink anything but aërated waters ; but what causes the greatest consumption of soda water in India is the "Peg." This is a drink of whisky or brandy mixed with a bottle of soda water, and ninety-nine one hundredths of the liquor is drunk in this way. Whisky is never drunk "neat ;" but although it is well watered, I doubt if there is a place in the world where the consumption of liquors will average that drunk by the European population in India.

The term European applies to all foreigners in India who are of white skin. The aërated water trade is being much cut into by the regimental messes, who are large consumers. They buy a machine, manufacture their own waters and sell them to customers at greatly reduced prices. A petition has gone up to the Viceroy from the tradespeople, protesting against the soldiers competing with them in this way. Natives do all the work, prepare the syrup, and bottle the waters.

A feature of the drug business is that no small quantities are sold as a general rule. Most things are put up in bottles and the customer must take a bottle or none. If he asks for an ounce of chlorate of potash lozenges, he is told they are only kept in bottles, one rupee each, a four

* Read before the Alumni Association of the Philadelphia College of Pharmacy. Reprinted from the *American Journal of Pharmacy*.

ounce bottle containing about three ounces of lozenges for forty cents. Vaseline, lime water, ipecac. wine, spirit of nitre, etc., are all kept in bottles, and it is very seldom any one inquires for half an ounce or one ounce, and sends a bottle for it. Many things that are sold several times daily in all shops at home rarely find a sale here. Senna, salt, magnesia, and paregoric are sold once a week probably.

The prescription trade is large and profitable, there being a fixed price which is adhered to by most Europeans. There are many native chemist shops which advertise the compounding of prescriptions, but many who deal exclusively with them for other things, send their prescriptions to European chemists.

There are a great many native doctors who have a diploma from some Indian native university, who can speak and write English, and have considerable practice. Then there are the apothecaries, who are employed by the Government in every station to take charge of the station dispensary and practice among the Government clerks, such service being given to them free, while the apothecary draws an income also from the tradespeople, many of whom employ him. The European doctors are all army surgeons who are appointed civil surgeons in the different European stations. Besides drawing his army pay he enjoys a large income from his practice. A civil surgeon serves three years in one station and is then transferred to another. From these different practitioners there comes a large prescription business and sale of surgical appliances, etc.

Few customers appear at the store, and then only when it is necessary to select, or when buying fancy goods, etc. A greater part of the trade is done by chits (notes sent by servants), and nine-tenths of the business is credit. Such a country for credit does not exist in another place, and there is not a firm that does not carry a large amount of bad debts on its books. People seldom carry money with them, and credit is refused only to those who are known as "bad hats."

Now, as to the preparation of prescriptions. In Bengal and the Punjab, the eastern and northern portion of India, the European assistant copies the prescription in the book, and at the same time calls out the ingredients to a native, who is called a compounder. He has served a sort of an apprenticeship in some dispensary, then has some experience in a drug store and there develops into a compounder. He seldom speaks English, but, as a rule, can make out the names of the ingredients and quantities, but can seldom read directions. He places all his bottles on the counter, and then prepares the prescription while the European gives him the quantities. Unless the prescription requires some special manipulation, he manages to compound it all right; but otherwise it is necessary to stand by him and tell him what to do. They do everything, prepare plasters, suppositories, etc., make all the preparations for the shelves, but everything must be checked. After the prescription is compounded, he calls out the quantities, and has his bottles in order as they appear in the prescription. Often he has gotten hold of the wrong bottle, and the preparation is useless. and all it concerns is an ejaculation and it passes out of his mind the next minute. It would be impossible for Europeans to do the work, the heat is so great, and working away at a batch of pills would cause a profuse perspiration in two minutes. There is a native for everything, and on account of the caste institution of India one man will not do the work of another. There is one man whose special duty is washing bottles, etc., another acts as an apprentice to the compounder, who shoves the hard work on him, such as working pill masses, pounding roots, etc., and so firm set are they in their feeling of respect for those above them they dare not rebel.

Bills are all collected by natives called chupprassees, and are sent out at the beginning of each month. There is a system of checking by which the bills can be traced daily to each chupprassee; and should any money be missing or not be turned in, and some customer declared he paid, the chupprassee to whom the the bill was delivered on the day of payment can be traced at once. But there is little stealing this way and natives are trusted with large amounts in their possession.

But nine-tenths of them steal, though in small amounts, and while your man would not steal a hundred dollars from you he would not scruple to steal a two cent piece. It is necessary to keep all the show cases locked day and night, and when serving a customer, you are compelled to unlock a case before you can get at the goods. Quinine and expensive chemicals are also under lock and key. The natives in the Government dispensaries stole so much quinine that, to protect itself, the Government have all their quinine coloured pink, which effectually prevents any one from disposing of it. As for lying, they are professionals, from the compounder to the lowest menial, and they can hatch up a lie in a twinkling. There is a man (Chowkedar), who sleeps on the verandah at night to receive any chits that may come and also to guard the place.

In the Bombay Presidency the European clerk has a still better time of it, as Portuguese compounders are mostly employed, and they write their own labels, copy the prescriptions and do not require checking, But what is most to be commended in the business in India are the hours. Here in Lahore we open at eight o'clock and close at six. One hour is allowed for breakfast, one for dinner or lunch, and a cup of tea is brought into the shop about four o'clock; close on Saturday afternoon at two, and never open at night or on Sunday. In Simla, in the Himalayas, where I served two years, in winter we opened at nine and closed at five in the afternoon.

It is a poor place to apprentice a white boy. From his earliest days all his work is done by natives, and when he comes into a shop he thinks he is being made a menial if called upon to do anything servants could do. So he gets no practical experience in the rudiments, learns the business in a superficial way, and would not be fit, when three years in the business, to take the place of a six months' apprentice at home. But do not let anyone who hears these lines come to India on a speculation. In the first place the climate is against you. Should you be on a Plains station during the summer you must be under a punkha—a large fan, which swings backward and forward above your head, creating a breeze—all day and all night. One is over your head in the dispensary, another in the shop proper, one over your dining table and one over your bed, and this last is the one which causes one to forget the commandments if anything in the world does. You go to sleep with the punkha coolie giving you a fine breeze. After an hour he falls asleep, and you awake in a profuse perspiration, and with a muttered ejaculation shy a boot at his head, which effectually wakens him for another hour. And thus goes on the night, and the poor punkha coolie in the morning is only too glad to get away and soothe his bruises.

It is difficult to get a situation. I came to India knowing nothing whatever of the country nor anybody in it. I found but three chemist shops in Calcutta employing Europeans, and this is the largest city in India. Then I received the awful information that every chemist brought his assistant out from England on an agreement, passage paid out and back, and the assistant to stop with his employer, three, four or five years as the case may be. In three weeks I was fortunate enough to secure a vacancy, but I might have been six months without even hearing of one. For a clerk to leave at the end of his agreement long notice must be given, allowing his employer ample time to bring out another man from England. Lastly your salary varies, a very distressing fact. The rupee, the coin used in India—silver—fluctuates. When I came to India it was worth 1*s.* 8*d.*, then it went down to 1*s.* 6*d.*, then to less than 1*s.* 4*d.*, and now it is at 1*s.* 6*d.*; it should be 2*s.* when at par, and I trust that when I leave the country it may be at a favourable rate of exchange to somewhat compensate me for the heat and fevers that I have endured since entering the country.

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THE STANDARD OF MEDICINAL PREPARATIONS.

THE judgment given last week by Lord COLERIDGE and Mr. Justice SMITH in the appeal from the decision of the Stipendiary Magistrate for the borough of Sheffield will doubtless afford general satisfaction to all who are desirous of seeing the proper standard of quality maintained in medicinal preparations. We are glad to notice that it has been commented upon in this sense by the medical papers. The *Lancet*, for instance, points out the danger to the public that may arise from the use of weak or impure drugs, and adds that the effects of the most skilful treatment may be lost through the defective nature of the medicines administered. In regard to this point, while fully recognizing the care and skill with which the majority of pharmaceutical chemists do their work, it maintains the necessity of guarding the public against the dishonest minority. This expression is harsh, but we must confess that in cases where it is proved medicinal preparations have been sold of defective character it cannot well be complained of. Nor do we think it would be of much effect as a mitigation of such an offence to plead that it had been committed in ignorance, or unknowingly. The vendor of drugs and medicinal preparations is especially bound to make himself aware of the quality of the articles he supplies. It is only in this respect that he can claim from the public consideration superior to that due to general traders. The purchasers of medicine are to a great extent in his hands, and from their want of special knowledge they are disproportionately more dependent upon him than they would be in any transaction with a grocer or a linendraper. If, therefore, the chemist fails to satisfy himself that his drugs and preparations are of the proper standard, he not only neglects his own interest by sacrificing the advantage of being able to give a personal guarantee for their quality, but he neglects his duty as well, and has, in such case, no reasonable ground for complaint if he is spoken of with disparagement.

In referring last January to the case out of which the appeal just decided has arisen, we took occasion to enforce the indispensability of a careful examination of all drugs and medicinal preparations by chemists and druggists. This is the more necessary when the preparations are not made by them, but as is now so frequently the case, obtained from wholesale houses. It is not sufficient to have implicit faith in the character of their supplies, and however much the makers may be deserving of such confidence, the fact of the chemist being able to vouch for every article passing through his hands is the only ground upon which he can lay claim to a higher rate of remuneration than the general run of shopkeepers. The *Lancet*, alluding to the fact that medicinal preparations are now often obtained from wholesale manufacturers of them, suggests that dispensing chemists as well as medical practitioners who dispense their own medicine are to a great extent at the mercy of the manufacturers; but, so far at least as the chemist is concerned, if he is so it is from his own omission to apply the knowledge and skill he ought to possess for the purpose of ascertaining that his drugs and preparations are what they ought to be. There is, moreover, in this direction an opportunity of doing something towards the removal of that great evil of medical dispensing which is the cause of the less satisfactory relations between medical men and pharmacists in this country, as compared with others where there is a more natural demarcation between medical and pharmaceutical functions. In connection with this subject we cannot omit to recall to the minds of our readers the admirable paper read by Mr. BARNARD PROCTOR before the North of England Pharmaceutical Association on pharmacopœial testing, in which he showed that very many of the preparations with which the dispensing chemist has to do can be readily submitted to examination with no other appliances than those appertaining to the ordinary dispensing counter. The field there opened up is one that will well bear development to general advantage, and we trust that Mr. PROCTOR will find time to continue his labours in showing how this useful branch of pharmaceutical work can be made an everyday and constant part of the duty of assistants and apprentices.

The discussion of the subject of the testing of quinine sulphate which has taken place since De Vrij endeavoured to represent that the presence of cinchonidine sulphate in the commercial salt was a circumstance newly discovered by himself, and one of importance as regards its therapeutic value, has at least been useful in directing more attention to the real facts of the case than it had been hitherto possible to command. The idea that quinine sulphate as ordinarily met with is, or ever has been, a substance of remarkable purity from a chemical point of view has been dispelled by the demonstration that it often contains several other bases besides quinine whose existence has in several instances only been recognized within a recent period. And although De Vrij's exaggerated estimate of the amount of cinchonidine in the commercial article has been disproved it has been sufficiently shown that this may vary so much as to affect materially the money value of different samples. The defective nature of most of the official tests has also been demonstrated,

and the importance of a careful examination of this article of the materia medica has been made evident. Dr. Hesse's observations in this respect have led him to give the preference to the bisulphate test recommended by De Vrij, and the recrystallization test introduced some two years ago by Paul. These he regards as giving results that are satisfactorily comparable; but the figures he gives as representing the results of his own work will be seen to show that the recrystallization test is the most delicate, and its results the most accurate.

* * *

Considered chemically, the base obtained from coffee and from tea has hitherto been regarded as one and the same substance, though the names of caffeine and theine have been applied to it according to the source from which it is obtained. It is, moreover, probable that as a commercial article it is chiefly, if not entirely, produced from tea. There have been statements that the base obtained from coffee has a physiological action different from that of the base obtained from tea, but they have not met with much acceptance, though it is a common opinion that there is a decided difference between the effects of tea and coffee when used as beverages. This question has recently been studied by Dr. Lauder Brunton and Dr. Cash, and in a paper read before the Royal Society they have described a difference in the action of caffeine and theine upon the voluntary muscles which is sometimes exceedingly well marked, though variable. According to these authorities theine seems to be more powerful in its action than caffeine, and there is a qualitative difference between them, inasmuch as theine tends to produce rhythmical contractions in the muscle. The study of such differences in the physiological action of substances differing in composition has already given a number of interesting facts, and it appears likely to be a means of throwing still further light upon the constitution of substances which appear to be chemically identical.

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It is nearly two years ago since we called attention to the fact of the formation of a South African Pharmaceutical Association for the promotion of the interests of pharmacy in Cape Colony, the first meeting of the Association having been held in King William's Town in July, 1885. One of the earliest efforts of the first President of the Association, Mr. Des Vages, who was also a member of the colonial legislature, was to get a Poisons Bill enacted, but this had to be abandoned in consequence of the strong opposition it evoked. It is admitted that under the present conditions of the colony, when, except in large towns, chemists' shops are rarely to be found less than forty miles apart, considerable inconvenience would attend any restrictive legislation applying to the less populous districts of the colony. But, nevertheless, it is felt that there are many ways in which good work could be done by a strong pharmaceutical society, and with this view an appeal has been issued by the present President of the South African Pharmaceutical Association, Mr. Albert Walsh, for the co-operation of all pharmacists in business in the colony, as well as their assistants and apprentices. Among the objects contemplated as desirable of attainment by the Association, are—(1) that the Government examinations for the chemist's licence shall be conducted by chemists who shall have seats on the Medical Board for that purpose; (2) that such examinations shall be held at least once a year in Cape Town, Port Elizabeth, Kimberley and King William's Town; (3) the reciprocal recognition of licences with the other South African States; (4) the compilation of a correct register; and (5) the prevention of unregistered persons from carrying on business on their own account as chemists and druggists.

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On a recent occasion, when the subject of dispensing was being discussed in the House of Commons, the member for Ross and Cromarty, himself a medical man, was reported to have said that in this country the wives of medical practitioners generally do the dispensing. It would seem that a still more liberal view is taken in some quarters of the qualifications for dispensing, if we may judge from an advertisement appearing in the *Glasgow Herald* a few days since, under the heading "MEDICAL," as follows:—"A young man wishes situation as groom and dispenser to doctor in the country." The existence of a demand for such combined services may be inferred from the fact of their being thus publicly offered, and some idea may be formed of the conditions under which the dispensing of medicine is carried out in such cases by medical practitioners. Our correspondent who sends the cutting thinks that in the face of such a system as is suggested by this advertisement it is unreasonable to attempt to establish a curriculum of study for persons intending to become chemists and druggists, but we cannot agree with him in the view that the vicious system he refers to can be any justification for their omitting to make themselves competent for the discharge of the duties they propose to undertake.

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We learn from the *Indische Mercur* that the quinine factory in Amsterdam, which stopped working some months ago, has been purchased by one of the late Board of Directors with a view to reorganization of the business, in the carrying out of which Messrs. Böhringer and Son, of Mannheim, will take an active part.

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According to a table compiled by the *National Druggist*, there are at present in the United States forty-nine pharmaceutical associations more or less representative of the respective states or territories in which they are located, in addition to the American Pharmaceutical Association and two other associations of the nature of trade societies. In twenty-eight of the states and territories represented the practice of pharmacy is regulated by special Acts.

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A Detroit firm is coating menthol pencils intended for hot countries with gelatine, in order to prevent loss of menthol by volatilization before the pencils are required for use.

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We learn that Dr. Withers Moore, of Brighton, President of the British Medical Association, has been suffering from serious illness, the result of having unfortunately taken a teaspoonful of carbonate of potassium instead of bicarbonate of potassium.

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The next meeting of the School of Pharmacy Students' Association will take place on Thursday, June 2nd, when Mr. E. Young will read a paper on "Turpentine and Terpenes," and Mr. Tingle will give his postponed Report on Analytical Chemistry.

Proceedings of Scientific Societies.

ROYAL INSTITUTION.

Some Electrical Fishes.

A lecture on "Electrical Fishes" was delivered at the Royal Institution on Friday, the 13th inst, by Dr. Burdon Sanderson, who has had the opportunity of studying the physiology of the "torpedo" fish during a recent visit to the shores of the Bay of Biscay. With a view of making his subject more interesting, the lecturer not only gave the results of his research, but also compared the physiological structure of the torpedo (*Torpedo vulgaris*) with those of *Malapterurus electricus* and *Gymnotus electricus*, whilst the Zoological Society had placed a fine living specimen of the latter fish at his disposal during the evening. It was with a fish of the latter type that Faraday experimented, and found that the strongest shocks were obtained by touching the fish simultaneously at the head and tail, whilst scarcely any effect was observed on touching each side at the same distance from the extremities. He calculated that at each medium discharge the animal emitted as great a force as the highest charge of a Leyden battery of fifteen jars, exposing 3500 square inches of coated surface. The Gymnotus, or electrical eel, is common in the tributaries of the Orinoco, and is generally captured by causing the fish to expend their shocks upon horses driven into the stream, until exhausted, when they become an easy prey. The electrical organs form more than half the body, and consist of four batteries, two on each side, one above the other, the uppermost or dorsal being the larger. These batteries consist of a series of parallel piles placed horizontally in a direction from head to tail, each layer consisting of protoplasm upon the upper and nerve upon the lower surface, and these are again subdivided by transverse sections. In the Malapterurus, a genus of fishes of the family *Siluridæ*, the whole animal is clad in a tegument of dense tissue, which in this case constitutes the electric organ and is connected with the nervous system by one large nerve. It is remarkable that the natives on the Congo use the same word for the name of both this fish and the telegraph. The torpedo, which is allied to the skate, and varieties of which are found in the Mediterranean, Atlantic and Indian seas, differs from both of the former in possessing a special brain, or rather a special lobe of the brain, termed the "electrical lobe," which is situated behind the cerebellum and has control over the electric organs of this fish. These organs are divided by means of a number of vertical columns, about five hundred in an ordinary specimen of the torpedo, although in the case of one caught off the coast of the United States, 5 feet in length and 12 stone in weight, one thousand of these columns were observed. The divisions between the columns are again subdivided into compartments presenting a honeycomb appearance, and to each of these compartments five nerves are attached, so that in a medium-sized fish some twelve thousand nerves are employed in the electric organs. Dr. Sanderson gave a very elaborate description of the arrangement of the nervous system in the torpedo, showing how the large nerves pass along the vertical columns, sending out branches to each of the cells on either side, the nerve invariably passing along the lower side of the cell wall. Throughout the lecture Dr. Sanderson illustrated his remarks by photographed sections of the parts under discussion thrown upon a screen, but at this stage some very fine microscopical slides were projected, the results of the lecturer's recent work. These slides not only illustrated the general arrangement of the nerves, but descending into further detail showed that the principal nerves were sheathed, whilst the smaller ramifications were not, whilst at the end of the nerve there was no complex structure observable, but a simple termination. Having thus brought before his audience the least technical of his observations, Dr. Sanderson proceeded to discuss the origin and use of the electric organs in fishes. In most cases the initial development of the electric organs is similar to the development of muscle, but in the Malapterurus it is not the muscular system which is transformed, but the skin, glands and other parts connected with the skin. The lecturer raised the question as to why fishes had been provided with such a weapon of attack or defence. In the case of the torpedo, has the torpedo degenerated into the skate through not making use of its electrical organs, or is the skate the original form of the torpedo? Both hypotheses seem unstable, as it hardly seems probable that a fish would cease to make use of such a useful adjunct as electricity in procuring food, or that it should by any circumstances develop an organ of which there is no sign in the original, although some naturalists assert that in the tail of the skate there is a development which may allow of such a possibility. Dr. Sanderson, however, thinks it quite as probable that the electric organ should be formed from the muscular system as the muscle formed from the electric organ, and prefers to consider that they have both their origin in a simpler element. If such be the case, by what steps have these organs progressed in their development from the original matter? The lecturer expressed an opinion that most probably an answer would be found to this question in an exhaustive microscopic examination of the nerve. Looking at it from the physiological side, the only difference between the muscles and the electric organs is, that one is supplied with motor nerves, the other with electro-motor nerves. Another remarkable fact recently observed by Dr. Sanderson, to which he drew attention, is that two kinds of shocks are experienced in experimenting with electrical fish. Thus, when a fish is suddenly touched or attacked, a sharp explosive shock is felt, but the more normal effect is a prolonged series of smaller shocks of inferior intensity. The lecturer made this point very apparent to his audience by touching the specimen of Gymnotus present simultaneously at the head and tail with two wires connected with an electro-magnet, when the shocks delivered were made perceptible by the movement of a paper lever, the shadow of which was thrown upon the screen. The Chairman was even more favourably situated, as he was enabled, by means of a telephone, to hear the distinct shocks produced. Dr. Sanderson also gave the results of a series of experiments conducted with regard to the measurement of the period of time elapsing between the "exhortation" of the fish and the delivery of its shock, and also concerning the duration of the shock. He found that after a sudden attack one-hundredth of a second elapsed before the primary single response to the exhortation was obtained, the discharge reached its maximum power one-five-hundredth of a minute after its commencement, and had a duration of about one-fourth of a second. On continued irritation a number of smaller shocks were received, recurring at intervals of about one-fiftieth of a second.

SOCIETY OF CHEMICAL INDUSTRY.

The Digestive Ferments.*

BY F. BADEN BENGER, F.C.S.

At the request of several members of the Committee of this Section of the Society of Chemical Industry I have undertaken to read a short paper on the digestive ferments, and to give some illustrations of the action of these ferments on articles of food. I at first hesitated very much to pose before you in the position of one who presumably has something new to say—when I have so little—but I was reminded that this particular branch of physiological chemistry is probably rather outside the field of observation of most members of the Section, although many of the experiments I have to show you

* Read before the Manchester Section of the Society of Chemical Industry.

are in reality performed daily by each one in his most private laboratory—his stomach. These are the considerations which led me to attempt the task of interesting you for a very few minutes this evening.

The study of these digestive processes has naturally attracted the attention of many eminent men. In this country one of the most recent, and certainly the most distinguished investigator, has been Sir Wm. Roberts, M.D., F.R.S., of this city, and to his researches I am indebted for much that I have to bring before you.

Digestive ferments is the name given to certain principles secreted at different points in the alimentary canal, their office being to transmute the food we eat into products capable of being assimilated, and so used in the building up of our tissues, or in supplying the necessary fuel required to maintain the continuous working of our several functions. Speaking generally these ferments have the power of increasing the solubility and diffusibility of food—for instance, starch is converted into sugar (maltose), and albumen into peptone. The changes brought about are not, chemically speaking, complicated, though the physical condition of the substance acted on is often entirely altered. The actual ferments themselves have never been absolutely isolated. It is known, however, that they are albuminoid, or are invariably associated with albuminoid matter; they are soluble or unorganized, as distinguished from the organized and insoluble ferments, such as yeast. They are precipitated from watery solution by alcohol, but even prolonged contact with this fluid does not injure them. When the alcohol is removed their solubility and activity are found to be unimpaired. They are destroyed by many chemical reagents, and when in solution they are coagulated and rendered permanently insoluble and inactive by a temperature of about 75° C. They have no power of self-multiplication or growth of any kind, as is the case in the class of so-called organized ferments, but their action is quite distinct from what we understand by chemical, in the ordinary sense of the word. I shall presently have the opportunity of illustrating my meaning by an experiment. A special interest attaches to these principles from the fact that they play so important a part in our individual organisms. Their origin is shrouded in mystery, they are formed under the influence of vitality, and seem indeed to be a remnant of unexpended vital force.

The importance of preparations of these ferments in modern civilized life is considerable; some of them are largely used in medicine, and others are employed in the manufacture of peptonized or partially digested foods.

The first of the secretions with which our food is brought in contact in the process of digestion is the saliva. One of the purposes served by saliva is to lubricate the morsels of food, and so facilitate their being swallowed, and this probably is the extent of its service with regard to meat, and many other articles of diet; but saliva contains a very important ferment—ptyalin. This body may be precipitated in an impure condition by adding filtered saliva to strong alcohol. Its action on cooked or gelatinized starch is similar to that of malt diastase, converting it into dextrine and sugar. Starchy foods of course form a considerable part of the diet of man. The importance of ptyalin can, therefore, be well understood, especially when it is known that starch is not acted on by the juices of the stomach, and that it is not until it reaches the duodenum that farinaceous food is again brought under the influence of a starch-digesting ferment. It is essential that the starch should be cooked, as raw or unbroken starch granules are scarcely acted on at all by the saliva of man, though the lower animals are capable of digesting it. I have here a small quantity of ptyalin, and if I add a little to this test tube full of warm starch mucilage you will observe that a change will shortly take place. The change is much more rapid if saliva is used, as the ptyalin is then in solution, and a few seconds will be required to bring the ptyalin to the same condition. The first step in the digestion of starch is the formation of soluble starch; a bright transparent solution is obtained which still gives the blue reaction with iodine; then dextrines are produced, yielding brown and yellow reactions with the same reagent; and finally sugar, yielding no coloration with iodine. This digestion of starch by ptyalin can take place only in alkaline, neutral, or faintly acid media. The juices of the stomach during digestion are acid, but it seems probable that masses of bread and other farinaceous food, saturated with saliva, would continue for a time to be acted on by the ptyalin after they reach that organ, as they could hardly be immediately permeated by the gastric juice.

We now come to the digestive ferments of the stomach. These are pepsin and a curdling ferment, the active principle of the well-known rennet used in the manufacture of cheese. Pepsin is the agent by which albuminous matter or proteids, such as meat, eggs, etc., are converted into soluble peptones in the stomach, and thus fitted for absorption. Though not absolutely inert in neutral media, it is practically so. The normal acidity of the gastric juice is equal to about 0·2 per cent. of HCl, and though it is probable that during the digestion of meat, etc., other acids are set free from salts contained in the food, hydrochloric acid is found to be the one secreted with pepsin in the gastric juice. Water containing 1 per cent. of strong hydrochloric acid is a suitable medium for experiments with pepsin.

Pepsin, like all the digestive ferments, is soluble in water or glycerin. From an aqueous extract of the mucous membrane of the stomachs of animals it may be precipitated in various ways—perhaps it would be more correct to say that precipitates may be obtained in which the presence of pepsin can be demonstrated by its digestive power. But actual pepsin has never been isolated, and attempts to purify the precipitate are very apt to lead to great diminution in its activity. The mucous membrane does not always yield an active extract. The pepsin is sometimes incompletely formed. It may exist as what is called pro-pepsin or pepsin-precursor, and time, aided by atmospheric influences, may be necessary in order to develop the perfect ferment.

The Pharmacopœia process for preparing pepsin is the somewhat rough-and-ready one of scraping the cleansed mucous surface of the stomach of the pig with a blunt knife; the matter thus removed is dried at a temperature not exceeding 120° F., and powdered. Carefully prepared this is a fairly active product; but the best that can be said of it is that it contains the proteolytic ferment of the stomach mixed with much undesirable animal matter, extremely liable to decomposition. I once asked a candidate at an examination of the Pharmaceutical Society how to make Pharmacopœia pepsin, and he told me it was done by scraping the outside of a sheep after the removal of the skin. I have examined some specimens of pepsin which may have been prepared by this method.

Some commercial pepsins are prepared by precipitating aqueous extracts of the mucous membrane of the pig or sheep; the precipitate is commonly mixed with starch powder or sugar of milk. Fuid preparations are, however, now much used; but by whatsoever process pepsin is prepared, the only test of its quality that can be applied is the measure of its digestive power. The mode of applying this test adopted in the last edition of the British Pharmacopœia is one proposed by myself in a paper read before the British Pharmaceutical Conference at its York meeting in 1881. The official direction is as follows:—"Two grains of it with an ounce of distilled water, to which 5 minims of hydrochloric acid have been added, form a mixture in which at least 100 grains of hard-boiled white of egg, pressed through wire gauze of thirty-six meshes to the linear inch, and made of No. 32 brass or copper wire, will dissolve on their

being well mixed, digested, and well stirred together for thirty minutes at a temperature of 130° F."

In previous editions the white of egg used was ordered to be in thin shavings, the temperature 98° F., and the time "about four hours." The test was tedious, the condition of the egg not precisely indicated, and the element of time more or less variable according to the meaning attached to the word "about."

My original paper contains some details of manipulation necessarily omitted from the brief Pharmacopœia directions. In practice I find that the white of egg having been pressed through the wire gauze and weighed, is best lightly rubbed in a glass mortar with the acidulated water; this separates the vermiform particles, which cannot be satisfactorily accomplished by mere stirring; this is, of course, most important, as the amount of albumen dissolved, other things being equal, will depend on the amount of surface presented to the action of the ferment. The mixture is then poured into a large test tube and floated in a beaker of water. Half a dozen such tubes, numbered, and each containing 100 grains of hard-boiled white of egg and 1 oz. of acidulated water, can thus be floated in the same water-bath, and the same number of examples of pepsin or preparations of pepsin can then be tested under absolutely identical conditions. This latter point is most important in comparative experiments, for it must be remembered that the digestive power of pepsin is greatly influenced by many circumstances, the degree of subdivision of the egg, the temperature of the mixture, the volume of the solvent, and the frequency with which the mixture is stirred. Having floated the charged test tubes in the beaker, as shown on the table, and provided each tube with a small glass stirrer so that pepsin may not be transferred from one tube to another, the heat of the spirit lamp or Bunsen's burner is applied until the temperature of the whole has reached 130° F. There is no practical difficulty whatever in this, and any slight variation of temperature affects all the tubes alike, so that the value of the test for comparative experiments is not influenced by slight variations.

The samples of pepsin or its preparations, having been previously weighed or measured, are now added to the tubes and the temperature maintained as nearly constant as possible, care being taken that it does not rise above 130° F. The contents of the tubes should be stirred at regular intervals, say every five minutes, and in half an hour the albumen should have dissolved. The glass water-bath is more convenient than the ordinary water-oven or incubator, as it enables the operator to see the progress of the experiment, and in practice it is often easy to select the best sample of pepsin in a few minutes.

It will, of course, be noticed that the temperature employed in this artificial stomach is much higher than that of the body. It was adopted because it was found that about 130° F. is that of the maximum activity of pepsin, and experiments had shown that specimens of pepsin which were most active at the higher temperature were invariably the most active at the temperature of the body (98° F.), whilst the adoption of the higher temperature enabled the operation of testing to be accomplished in half an hour instead of occupying four hours, as in the previous edition of the Pharmacopœia.

Some may perhaps be asking themselves the question, How can a dose of pepsin which requires twenty or thirty minutes to digest 100 grains of egg at 130° F., have any appreciable effect on a meal when taken as a digestive?

In answering this, we must not forget the fact that whilst in our laboratory experiments the products of digestion remain in the digesting apparatus to gradually retard, and finally stop, the action of the ferment, in the stomach these products are constantly removed as digestion goes on. It must not be supposed that 100 grains of egg albumen is all that 2 grains of B.P. pepsin, or the minimum dose of a fluid preparation, will digest in half an hour under other conditions and with other surroundings. The following experiment (described by me in *The Lancet*, April 3, 1886) will demonstrate the contrary. I took ten times the Pharmacopœia quantity of egg and acidulated water—that is, 1000 grains of egg and 10 fluid ounces of water; these were placed in a beaker; 100 grains of egg and 1 oz. of acidulated water were put in a test tube and stood in the beaker, and the whole heated to 130° F. A teaspoonful, the minimum dose of an active fluid preparation of pepsin, was then added to both beaker and test tube, the temperature maintained constant, and the contents of both stirred occasionally. When the egg in the test tube had all dissolved, which in this experiment occupied twenty-five minutes, the contents of the beaker were thrown into a fine muslin filter and drained; the undissolved egg weighed 220 grains. Here, then, a small dose of pepsin had dissolved 780 grains of egg in 10 ounces of fluid, whilst a similar dose had dissolved 100 grains in 1 ounce of fluid. Another attempt was made to approach more nearly to the conditions under which pepsin acts in the stomach. The egg, acidulated water, and pepsin were placed in a parchment dialyser and floated on a bowl of acidulated water. In this case it was found, also, that enormously more egg was dissolved in the dialyser, where the products of digestion could diffuse away, than in a test tube containing a similar mixture.

Each of the two beakers on the table contained, this afternoon, 1000 grains of hard-boiled white of egg and 10 ounces of acidulated water. To one I added a teaspoonful of an active solution of pepsin, and maintained it at a temperature of 130° F. for half an hour—you will observe that the white of egg has disappeared, and it now exists as peptone, or peptones, for there are several—in solution, and the presence of this peptone can be easily demonstrated by a colour test. When a solution of peptone is rendered strongly alkaline with potash, and a few drops of Fehling's copper test are added, a beautiful rose colour is produced. I will apply this test to a portion in a test tube.

The second ferment contained in the gastric juice is that known as the curdling ferment, and is familiar to all of us as the active agent in rennet. Its sole property, as far as is known, is to curdle milk, to cause a separation of the casein, though it is probable that it serves some other purpose. If it were found only in the stomachs of milk-consuming animals, we might rest on the supposition that it is merely a milk curdler, but Sir William Roberts has obtained it from the digestive organs of the fowl, and I have myself extracted it from the stomach of the cod-fish. Now, neither of these creatures can possibly require the services of a milk-curdler. The curdling power of gastric juice was long considered to be due to pepsin, but it is now known to be caused by the presence of a distinct ferment. If the mucous membrane of the stomach of the calf be macerated in a saturated solution of common salt, an extract is obtained practically destitute of proteolytic power, but extremely active as a curdler. If I add a few drops of this solution to a beaker of warm milk (about 100° F. is the best temperature), and stir them together, we shall see that in a few minutes the milk will solidify in a characteristic manner—a solid jelly-like mass being produced. If this be now broken up with a glass rod, the casein, or curd, will shortly contract, and form lumps floating in the whey. Much of the fat of the milk is entangled with the casein in these masses, and the whey is chiefly a solution of the lactose, or sugar of milk, and the salts.

The ferments of the pancreas or sweetbread have not, until recently, attracted much attention, and the remarkable digestive power of the pancreatic juice was scarcely suspected. Three of these ferments are known to exist; an amylolytic or starch-digesting one, resembling ptyalin in its power of converting starch into sugar, a proteolytic or proteid digesting one called trypsin, and another curdling ferment. The ferments of the pancreas, like those of the stomach, have not yet been absolutely

isolated; they may be extracted from the minced pancreas by similar solvents, water, or glycerin—and here again, the same difficulty is experienced as in extracting the ferments from the mucous membrane of the stomach. The gland may contain no completely formed ferments. They may exist as zymogen, or mother of ferments, and our solutions may prove inactive until the perfect ferment is developed.

I am not aware of a process by which they can be entirely separated from each other. I have obtained by fractional precipitation from aqueous solutions with strong alcohol, precipitates possessing respectively very much more of the diastasic and of the tryptic ferment, but have never completely separated them. Like the peptic ferments, they are very easily destroyed, and the utmost care is necessary in their preparation,

I have here a solution of these pancreatic ferments, and will first give you an illustration of its starch-digesting or diastasic power. This beaker is filled with warm thick starch mucilage. If I add a little of the solution and mix it with the starch paste by stirring, you will notice a rapid change in the contents of the beaker—they quickly become thin and transparent. I can now pour them from one beaker to another like water. If we now apply the well-known iodine test for starch to a portion, we shall still get the blue coloration—the starch has for the most part been merely converted into the soluble modification; but the digestive process is going on, and in a short time we should get the brown, and then the yellow, reaction of the dextrines; but to save time I will add a little more of the pancreatic solution—now iodine no longer produces a blue reaction—the starch no longer exists as starch, but as dextrine. A few more drops are added, and now no colour is produced by the addition of iodine; the starch has been transmuted into sugar (maltose). The rapidity of this transmutation depends upon the proportion of ferment to starch. It is easy to produce the change almost instantaneously. If I half fill this test tube with the pancreatic solution, warm it slightly, and add a drop or two of the starch mucilage, I cannot apply the iodine test in time to catch a molecule of the starch unconverted. This illustrates the peculiar action of the ferments, to which I referred early in my paper. This change from starch to sugar can be produced almost as rapidly as the neutralization of an acid by an alkali; but, on the other hand, if the proportion of ferment to starch be small, many hours may be required to effect the transformation; or, if still smaller, the ferment may exhaust its energy before the whole of its work is accomplished. Sir William Roberts, in his Lumleian Lectures, gave a very graphic illustration of this action. "There is," said he, "something in this, strikingly suggestive or reminiscent of the action of living organisms. To illustrate my meaning, let us compare the particles of the ferment to a band of living workmen, whose function it is to scatter little heaps of stones. If the heaps are few, and the workmen many, all the heaps will be scattered at once, and the energy of the workmen will remain sensibly unimpared; but if the heaps are millions, and the workmen hundreds, and if the workmen are doomed to labour on until they fall exhausted at their task, the scattering of the heaps will go on for a comparatively long time, and the process of exhaustion will be a gradual one."

We will now turn to the proteolytic or proteid-digesting ferment of the pancreas, trypsin. It will be remembered that the proteolytic ferment of the stomach, pepsin, is practically inactive in neutral solutions, and is destroyed by alkalies. Trypsin, on the other hand, is active in neutral and alkaline solutions, and inactive in more than feebly acid media. An alkalinity equal to about 1 per cent. of bicarbonate of soda seems the most favourable, however, to its full action. Its digestive power is exercised less rapidly on coagulated white of egg or fibrin than is that of pepsin. The casein of milk, however, is much more rapidly digested by the pancreatic than by the peptic ferment, and therefore affords us a convenient means of illustrating its action.

I have here two beakers filled with slightly-diluted milk. To one has been added a teaspoonful of the same solution of the pancreatic ferments used to demonstrate the action of the amylolytic or diastasic ferment, and the mixture has been kept at a temperature of about 55° C. for half an hour. There is very little alteration in the appearance of the milk. It is a little yellower; but a few tests will show that the casein has disappeared, and peptone has taken its place. I will pour some of the milk from each beaker into these test glasses, and add a little dilute acetic acid. In the peptonized or digested milk no precipitate is produced, but in the other the casein is, of course, precipitated. If we take two other test glasses of the peptonized and unpeptonized milk, and apply the test for peptone used just now, solution of caustic potash and a few drops of Fehling's copper test, we get the rose-red coloration instantly in the peptonized milk, but none in the other.

During the transformation of casein into peptone, an intermediate body called meta-casein is first formed. This is distinguished from ordinary casein by its property of coagulating on boiling. Ordinary milk can, of course, be boiled without change, but if we boil milk which has been submitted—for a few minutes only—to the action of a small proportion of the pancreatic ferment, and which is thereby partially peptonized, an abundant curdy precipitate is formed. This, however, can be entirely prevented by previously rendering the milk slightly alkaline; about 1 grain of bicarbonate of soda to the ounce of milk is sufficient to prevent the precipitation of meta-casein on boiling. That this does not prevent its formation can be shown by neutralizing a portion of alkaline milk at the proper period of digestion, and immediately boiling it, when the meta-casein will be thrown down as before.

We may illustrate the wonderfully rapid action of trypsin somewhat in the same way that we did the amylolytic ferment of the pancreas. I mix in this test tube a little pancreatic solution, water, and milk; it is even unnecessary to warm them. If, now, I apply the peptone test, the rose-coloured reaction is produced; some of the casein has already been converted into peptone.

By adding a solution of the pancreatic ferments to a large excess of strong alcohol, a white precipitate is formed, possessing both the amylolytic and proteolytic power of the original solution. I have some of this precipitate in my hand. It has been dried at a low temperature, and its activity is very remarkable. If I take a small fraction of a grain of it on the point of my penknife, and stir it into this beaker of warm starch mucilage, you will observe in a few seconds that a change is going on; the mucilage has become thin and clear, the starch is rapidly undergoing transformation into dextrine and sugar. Its action on milk, too, is similar to that of the pancreatic solution, from which it is precipitated. The pancreas contains yet another ferment, one capable of coagulating milk in a very similar manner to the curdling ferment of the stomach or rennet, but differing from it in this respect:—Rennet will coagulate neutral or very feebly alkaline milk, but alkalinity produced by a grain of bicarbonate of soda to the ounce of milk is sufficient to prevent it. The curdling ferment of the pancreas, however, is unimpaired by an alkalinity three or four times as great, so that the two ferments cannot be identical. It is singular that, until comparatively recent times, the only function attributed to the pancreatic juice was the digestion of fats, and yet to-day it is the one that is questioned. It is one I have never obtained satisfactory evidence of, and am, therefore, unable to demonstrate to you.

In testing preparations of the pancreatic ferments we have again to rely, as in the case of pepsin, on the measurement of the work they are capable of performing In an elaborate paper read before the Royal Society,

London, Sir William Roberts describes a method of accomplishing this. In the case of the amylolytic ferment, it is based on "the quantity of starch mucilage of known strength, which can be transformed by a unit measure of solution of the ferment to the point at which it ceases to give a colour reaction with iodine in a unit of time, and at a fixed temperature." The proteolytic ferment is estimated in a similar manner, except that milk is used instead of starch mucilage, and the indication or end-reaction of the experiment is the precipitation of meta-casein on boiling a portion of the milk.

A knowledge of the temperature at which the maximum activity of these ferments occurs is important in their practical application to the production of peptonized or partially peptonized or digested foods. The activity of the diastasic or amylolytic ferment commences a little above the freezing point, and rises gradually with the temperature until 30° C. is attained; it then remains stationary until 45° C., and then gradually falls with the further rise of temperature, until at 65° C. it ceases to act.

The activity of the tryptic ferment rises gradually with the temperature until 60° C. is reached, and then rapidly falls until at about 75° C. it becomes inert.

Peptonized or partially peptonized milk, and other articles of diet, are very largely used at the present time in rearing infants, and by invalids unable to digest ordinary food.

Fully peptonized milk has a slightly bitter taste, which is unobjectionable to many, and which may be covered by the addition of a little coffee. It is, however, seldom necessary to fully peptonize articles of food, and partially peptonized milk scarcely differs in appearance or taste from ordinary milk; nevertheless, it has been very considerably modified. Its undigested casein cannot be curdled by the acid juices of the stomach into tough compact indigestible masses, but forms on the addition of acid light flakes, which are much more easy of digestion.

In preparing this partially-digested milk, the following points should be borne in mind: 1st. The milk should be diluted with a fourth, or, better, with a third of its bulk of water. This entirely prevents the action of the curdling ferment of the pancreatic solution. 2nd. The temperature of the milk should be from 50° C. to 60° C., at which the tryptic ferment attains its maximum activity; and 3rd. That if the milk be not consumed by the infant or invalid as soon as it is sufficiently peptonized, it must be rendered slightly alkaline by the addition of about one grain of bicarbonate of soda to the ounce, and boiled up to put an end to the action of the ferment, the addition of soda being then necessary to prevent the precipitation of meta-casein. It is preferable, when convenient, to use the partially-peptonized milk unboiled with the ferment still active. Many other articles of food are peptonized in a similar manner—soups, beef-tea, farinaceous gruels, etc.

We must content ourselves on this occasion with the mere mention of the remaining ferments concerned in the digestion of our food. Bile is said to assist in the emulsifying of fats, and the intestines secret a ferment which changes cane sugar into invert sugar. Such, gentlemen, is the very hurried sketch of the principal digestive ferments which the limited time at our disposal this evening permits, and I feel that my apologies are due to you for having attempted to traverse so wide a field.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, May 19. Mr. William Crookes, F.R.S., President, in the chair. A number of certificates were read for the first time, and the following papers were read:—

The Formation of Hyponitrites. By Professor DUNSTAN and T. S. DYMOND.—Zorn (*Ber.*, xv., 1258) has stated that alkali nitrites and nitrates are readily acted on by ferrous hydroxide, forming hyponitrite, ammonia, nitrogen and nitrous oxide. Divers and Haga (*Trans.*, 1884, 87, and 1885, 364) allege that alkali nitrites yield much ammonia, but neither hyponitrite nor hydroxylamine, nor any gaseous product; and that alkali nitrates are wholly unaffected; while nitric oxide in presence of alkali is to a large extent converted into ammonia by ferrous hydroxide, but yields no hyponitrite. The authors find that nitric oxide in the absence of alkali is reduced by ferrous hydroxide to nitrous oxide and nitrogen; no ammonia or hyponitrite is formed. In the presence of an alkali (sodium hydroxide) nitric oxide is partly reduced to nitrous oxide and nitrogen, and partly absorbed; the solution contains hyponitrite and ammonia. but on standing with excess of ferrous hydroxide it evolves nitrogen, and the hyponitrite disappears. The amount of hyponitrite formed depends within certain limits on the quantity of alkali which is present, on the quantity of ferrous hydroxide used, and on the time during which action is allowed to proceed. When three formula weights of ferrous hydroxide, $Fe(OH)_2$, and one of nitric oxide are used, the quantity of hyponitrite formed increases with each formula weight of sodium hydroxide that is added. About 20 per cent. of the nitric oxide may be converted into sodium hyponitrite. Alkali nitrites and ferrous hydroxide readily interact, producing nitrogen, nitrous oxide, ammonia and hyponitrite. The amounts which are formed of these substances depend on the quantity of ferrous hydroxide used, and also on the time during which the action continues. Excess of ferrous hydroxide after some time converts sodium nitrite entirely into nitrogen and ammonia. As a lecture experiment it is recommended to dissolve 5 grams of ferrous sulphate in about 25 c.c. of water, and to precipitate the liquid with sufficient of a 10 per cent. potash or soda solution to leave the mixture faintly alkaline; 1 gram of sodium nitrite dissolved in about 25 c.c. of water is then added, and the mixture stirred. After effervescence has ceased, and the liquid has stood for about half an hour, it is filtered. If the filtrate is diluted with an equal volume of water, and carefully neutralized with acetic acid, on the addition of silver nitrate a pale yellow precipitate of silver hyponitrite (mixed with some silver nitrite) will be obtained. Or a few drops of a silver nitrate solution may be added to the liquid before neutralization; but in this case the precipitate will rapidly darken in colour. Alkali nitrates are hardly at all affected by ferrous hydroxide; small quantities are slowly converted into ammonia. In explaining their results, the authors draw attention to the simultaneous formation of hyponitrite and hydroxylamine when sodium amalgam acts on dissolved sodium nitrite. They show that the ammonia is not derived from a further action of sodium amalgam on the hyponitrite, which yields only nitrogen. Similarly, ferrous hydroxide liberates nitrogen from sodium hyponitrite, but no ammonia is formed. They consider that the action of sodium amalgam on a solution of sodium nitrite is best explained by supposing that the sodium nitrite combines with two hydrogen-atoms, forming $NaN(OH)_2$. This compound may decompose, yielding hyponitrite: $NaN(OH)_2 = NaNO + H_2O$; or it may undergo reduction, yielding hydroxylamine,

$$NaN(OH)_2 + 2H = NaOH + NH_2OH,$$

and also ammonia and nitrogen—

$$4NaN(OH)_2 + 10H = 4NaOH + N_2 + 2NH_3 + 4H_2O.$$

Ferrous hydroxide, it is suggested, acts in the same way, being a substance which will combine with the hydroxyl of water when sodium nitrite is present to unite with the hydrogen. Any hydroxylamine which may be formed will at once be converted into ammonia by ferrous hydroxide. The authors find that when excess of ferrous hydroxide is used, and nitrogen and ammonia are the only products, the reaction takes place almost exactly in accordance with the equations—

$$(1)\ 4NaNO_2 + 8OH_2 + 8Fe(OH)_2 = 4NaN(OH)_2 + 8Fe(OH)_3$$

(2) $8NaN(OH)_2+6OH_2+14Fe(OH)_2=8NaOH+3N_2+2NH_3+14Fe(OH)_3$.

Since nitric oxide in presence of alkali yields exactly the same products as nitrites, the change can be most readily explained in the same way, assuming that the compound $NaN(OH)_2$ is first formed.

Ozone from Pure Oxygen. By W. A. SHENSTONE and J. TUDOR CUNDALL.—The authors describe an apparatus in which oxygen has been prepared and stored without the possibility of air gaining admittance. So far as it is possible to determine the purity of the gas by tests, it would appear certain that it has contained at most $\frac{1}{5000}$ of nitrogen. The oxygen has been collected and sealed up in glass tubes containing phosphoric oxide, in contact with which it has been kept for periods ranging from eight weeks to eight months. Subsequently it has been submitted to the action of electricity, and the ozone produced has been measured. In one experiment made at 10° C. no less than 11·7 per cent. of the oxygen taken was converted into ozone. This is a very considerably higher proportion than has been obtained either by Brodie or by the authors from ordinary oxygen when similar means of electrification are employed, but not so high as was obtained by Andrews and Tait, who, however, worked in a different way, and the exact value of whose results is uncertain in consequence of the tendency of the sulphuric acid that they used in their gauges to absorb ozone. The action of dry ozone on dry mercury has also been well studied. Dry ozone from pure oxygen is decomposed in the well-known manner by pure and dry mercury, but without visible oxidation of the mercury. Further, when a definite volume of oxygen is ozonized and afterwards left in contact with mercury for many hours, the oxygen almost entirely recovers its original volume, the small differences observed between the initial and final volumes being probably due to the difficulty of measuring oxygen with accuracy in a tube partly coated with mercury. The authors point out that the apparently high yield of ozone obtained under somewhat unfavourable conditions as to temperature may be due :—1. To the absence of nitrogen, the presence of which Andrews has shown is, under some conditions, very unfavourable to the production of ozone. 2. To the character of the electric discharge, which is most free from large sparks when the air and glass surfaces from which the discharge takes place are free from moisture.

The Volumetric Relations of Ozone and Oxygen. A Lecture Experiment. By W. A. SHENSTONE and J. TUDOR CUNDALL.—Soret and Brodie have shown that if v be the contraction produced on the electrification of a mass of oxygen, then $2v$ will represent the further contraction that will occur on absorbing the ozone formed by means of turpentine. If it be true that ozone completely dissolves in turpentine, this indicates that three measures of oxygen are concerned in the formation of two measures of ozone.

The Thermal Phenomena of Neutralization and their bearing on the Nature of Solution and the Theory of Residual Affinity. By S. U. PICKERING.

The Action of Metallic Alkylates on Mixtures of Ethereal Salts and Alcohols. By T. PURDIE, Ph.D., B.Sc.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, May 19, Mr. Edmund White occupying the chair. The proceedings commenced with the following paper:—

BUTYL-CHLORAL HYDRAS.

BY J. J. THOMAS.

This body was discovered by Krämer and Pinner in 1871 during the course of an investigation they were engaged in with the object of discovering some useful substance in the accumulated bye-products at Schering's chloral factory, and Hofmann also proved it to be present in some samples of chloral-hydrate. The alcohol used in making chloral is purified from various badly-smelling bodies by passing it through charcoal, when a large quantity of aldehyde is produced by the dehydrogenation of the alcohol by the oxygen occluded by the charcoal, and also perhaps by the oxygen of the atmosphere acting on a large surface of the alcohol; and it is this aldehyde which is the source of the butyl-chloral hydrate found by Krämer and Pinner in the bye-products.

This butyl-chloral hydrate was formerly called croton-chloral hydrate from an erroneous idea of its composition, and the formula $C_4H_3Cl_3O.H_2O$ was assigned to it, but the discoverer, Pinner, afterwards found that the true formula was $C_4H_5Cl_3O.H_2O$, and that it was a tri-chloro derivative not of crotonic, but of butylic aldehyde.

Butyl chloral, $C_4H_5Cl_3O$, is manufactured by passing dry chlorine gas into aldehyde cooled to −10° C. until it is no longer absorbed. The product is then fractionally distilled, the part passing over between 163° and 165° C. being anhydrous butyl-chloral. This is a colourless, oily liquid of peculiar odour, having a specific gravity of 1·395 at 20° C., and boiling at 163° to 165° C., and on treatment with water, soon deposits crystals of butyl-chloral hydrate, $C_4H_5Cl_3O.H_2O$. The reaction probably consists in two molecules of aldehyde condensing to one molecule of crotonic aldehyde with the separation of water. This crotonic aldehyde by the action of chlorine yields HCl and mono-chlorcroton aldehyde, while the latter body unites with more Cl to form butyl-chloral, as represented in the following equations:—

$$2C_2H_4O=C_4H_6O \text{ (croton aldehyde)}+H_2O.$$

$$C_4H_6O+Cl_2=C_4H_5ClO \text{ (monochlorcroton aldehyde)}+HCl.$$

$$C_4H_5ClO+Cl_2=C_4H_5Cl_3O \text{ (butyl chloral)}.$$

Or, neglecting the intermediate steps, we may represent the reaction by the following equation:—

$$2C_2H_4O+2Cl_2=C_4H_5Cl_3O+H_2O+HCl.$$

When the formula $C_4H_3Cl_3O$ was assigned to butyl-chloral, it was supposed to be formed from crotonic aldehyde by the substitution of three atoms of Cl for three atoms of H, thus:—

$$C_4H_6O+3Cl_2=C_4H_3Cl_3O+3HCl,$$

but we now believe that only one atom of the H of the crotonic aldehyde is substituted by Cl, the product forming a direct additive compound with two more atoms of Cl.

The water in butyl-chloral hydrate, $C_4H_5Cl_3O.H_2O$, does not exist as water of crystallization, but is probably in combination with the butyl-chloral, forming a true dihydric alcohol, namely, trichlor-butylidene glycol, and its formula is more correctly written $C_3H_4Cl_3CH<^{OH}_{OH}$. It does not, however, yield chlorinated acids of the lactic and oxalic series on oxidation, but the elements of water are split off, and the product is trichlorbutyric acid, $C_3H_4Cl_3.COOH$. This of course must of necessity occur, as the two hydroxyl groups are attached to the same carbon atom. It is here interesting to note that although as a rule a carbon atom can only have one OH group combined with it, it may have two when the body is a chloro-derivative, but the union, as seen in this case, is feeble, and the elements of water are easily given off.

Liebreich claimed for this body an advantage over ordinary chloral hydrate in that it did not affect the heart, and it is also stated that, unlike chloral hydrate, it is not necessary to increase the dose as the patient gets accustomed to its use, and also that it is a specific in certain cases of facial neuralgia, but it is not nearly so extensively used as the ordinary chloral hydrate. As in the case of chloral hydrate it is doubtful whether its physiological effects are due to its specific action, or to the products of its decomposition by the alkali of the blood. The action of alkalies upon butyl-chloral hydrate may be represented by the following equations:—

$$C_4H_5Cl_3O.H_2O+KOH=HCOOK \text{ (potassium formate)}+C_3H_5Cl_3 \text{ (propylic chloroform)}+H_2O.$$

$C_3H_5Cl_3$ immediately decomposing to $C_3H_4Cl_2$ (allylene dichloride) + HCl.

Butyl-chloral hydrate was introduced into the British Pharmacopœia in 1885, and it is not official in any other pharmacopœia. The characters and tests given in the B.P. are as follows:—"Pearly-white crystalline scales, having a pungent but not acid odour resembling that of hydrous chloral, and an acrid nauseous taste. It fuses at about 77·8° C. to a transparent liquid, which in cooling commences to solidify at about 71·1° C. Soluble in about 50 parts of water, in its own weight of glycerine and of rectified spirit, and nearly insoluble in chloroform. The aqueous solution is neutral or but slightly acid to litmus paper. It should not yield chloroform when heated with solutions of potash or soda, or with milk of lime." I may also add that it is very soluble in ether. Its vapour is very irritating to the eyes.

The following table shows the result of the examination of five samples of butyl-chloral hydrate:—

	Fusing point.	Solidifying point.	Yield of $CHCl_3$ with KOH	Test paper.
No. 1.	77° C.	68·5° C.	None	Very slightly acid.
No. 2.	78° C.	69·5° C.	Distinct	Slightly acid.
No. 3.	79·5°C.	68·5° C.	None	Neutral.
No. 4.	77° C.	64° C.	None	Slightly acid.
No. 5.	79° C.	66° C.	None	Neutral.
B.P.	77·°8 C.	71·1° C.	None	Neutral or slightly acid.

All the samples examined corresponded to the B.P. description in appearance, odour and taste.

Sample No. 1 was prepared by myself from pure aldehyde. The first attempt to prepare the butyl-chloral failed, owing probably to the slight heating of the aldehyde during chlorination, and also perhaps to the use of excess of Cl, giving pungent acetyl chloride according to the equation $C_2H_4O + Cl_2 = C_2H_3O.Cl + HCl$. At the second attempt a moderate quantity of butyl-chloral was obtained, a sample of the hydrate from which is on the table.

In ascertaining the boiling point of butyl-chloral hydrate, it was noticed that ebullition commenced at 100° C., and continued up to 165° C. This suggested that the compound was dissociated by heat, and this was proved to be the case, because after maintaining another sample at about 110° C. for a short time, an oily liquid remained on cooling, which was proved to be anhydrous butyl-chloral, and which re-deposited crystals of the hydrate on the addition of water. It has long been known that ordinary chloral hydrate is dissociated by heat, but I can find no mention of this in connection with butyl-chloral hydrate, although the fact is much more evident, because with the latter the water is given off much below the boiling point of the anhydrous butyl-chloral, while in the case of chloral hydrate, both the hydrate and the anhydrous chloral boil about the same temperature as the water, and the dissociation can only be proved to have taken place by the determination of the density of its vapour.

This dissociation of butyl-chloral hydrate also greatly interferes with the determination of the fusing and solidifying points, and seems to take place to a greater or less extent below 100° C., depending probably upon the time the body is kept in the fused state. These points were first determined by fusing the butyl-chloral hydrate in a capsule over a water-bath, and sucking into thin tubes, which were then sealed at both ends, and placed in a water-bath after the butyl-chloral hydrate had solidified. Both the fusing and solidifying points obtained by this method were much too low, averaging 72° C. and 62° C. respectively, and in some cases the contents of the tubes did not solidify at all, and the liquid in the tubes was found to be anhydrous butyl-chloral. The method of placing a few crystals on the surface of mercury in a beaker placed in a water-bath was next tried, but was not found satisfactory.

The final method adopted, the results of which are arranged in the table, was to introduce some of the crystals into a tube with a bulb blown at one end, and to place the bulb and part of the stem in a water-bath. This I believe gives fairly accurate results for the fusing points, but dissociation seems to take place to a greater or less extent in the fused liquid, because sample No. 4, the solidifying point of which is marked 64° C., did not solidify at all until a drop of water at the same temperature was introduced into the bulb.

These experiments were first undertaken because several samples of butyl-chloral hydrate gave a distinct smell of chloroform when heated with alkalies, apparently indicating the presence of chloral hydrate.

$$CCl_3.CH<\begin{matrix}OH\\OH\end{matrix} + KOH = CHCl_3 + HCOOK + H_2O.$$

The presence of chloral hydrate would be accounted for by the action of Cl upon some of the aldehyde without condensation, thus:—

$$CH_3.COH + 3Cl_2 = CCl_3.COH + 3HCl.$$

But the allylene bichloride produced by the action of alkalies on perfectly pure well washed butyl-chloral hydrate has an odour almost, if not quite, undistinguishable from that of chloroform, so that the production of a chloroform odour is not sufficient evidence of the presence of chloral hydrate. Only one of the samples examined gave the unmistakable odour of phenyl carbamine when the alkaline solution was heated with aniline, showing that although all the samples yielded an odour resembling chloroform when treated with alkali, in one only was chloral hydrate present.

$$CHCl_3 + C_6H_5NH_2 \text{ (aniline)} = C_6H_5NC + 3HCl.$$

Chloral hydrate reduces Fehling's solution, but if the quantity of chloral hydrate is very small, no immediate reduction takes place in the presence of butyl-chloral hydrate, as was proved by some comparative experiments performed. This is the reason that none of the samples gave any immediate reduction with Fehling's, the quantity of chloral hydrate present in No. 4 being too small to bring it about.

This reduction of Fehling's solution by chloral hydrate is no doubt due to the formate formed by the alkali, thus —$2CuO + HCOOH = Cu_2O + H_2O + CO_2$, and the non-reduction of Fehling's by a pure sample of butyl-chlorate hydrate seemed to indicate that no formate was produced by the action of alkali upon the latter, and that the equation previously given for the reaction is not correct. Richter states that the products of the reaction are acetate and chloride of potassium and allylene dichloride, but does not give an equation for the reaction. Although the alkaline solution of butyl-chloral hydrate did not reduce Fehling's, it powerfully reduced $HgCl_2$ to HgCl, and also $AgNO_3$ to the metallic state when supersaturated with acetic acid, indicating the presence of some powerful reducing agent, most probably a formate. Taking for granted that a formate is produced, I am quite unable to explain how Fehling's solution was not reduced, but perhaps some one present will be able to offer some suggestion.

A discussion ensued, in which the Chairman, Secretary, Messrs. Eastes and Woolley took part.

Mr. Tingle's report on analytical chemistry was postponed to the following meeting.

Some miscellaneous subjects were discussed, the Chairman mentioning that in an estimation of copper by precipitation as metal by means of zinc, he had on one occasion used large excess of HCl and found that the supernatant liquor, although quite colourless when poured off, gradually became green on exposure, showing that some of the copper had remained as cuprous chloride; however, on repeating the experiment several times he had failed to obtain a similar result. The meeting then adjourned.

Chemists and Druggists' Trade Association of Great Britain.

At a meeting of the Executive Committee of this Association, held on the 25th inst., the following resolution was passed and a preliminary advertisement of the special general meeting appears in our advertising columns.

Resolved:—"That in consequence of the inadequate response to the circular of the Executive Committee of May 6, a special general meeting of the members of the Association be convened for Friday, June 17 next, to consider the expediency of winding up the Association."

It now remains for those members of the trade who have not responded to the circular, dated May 6, of the Association to prevent its final collapse by an immediate reply to that appeal.

Obituary.

JEAN BAPTISTE JOSEPH DIEUDONNÉ BOUSSINGAULT.

The death of Jean Baptiste Boussingault in Paris, on the 12th inst., has removed a man who has influenced chemical science far beyond the limits of his own country. Born in Paris in 1802, he commenced his public scientific career in 1821, while still a pupil in the School of Mines at St. Etienne, by the publication of a treatise upon the compounds of silicium with platinum. Shortly afterwards he went, in the employment of an English mining company, to Columbia, and was appointed professor in the School of Mines at Bogota. He was not allowed, however, to pursue his duties undisturbed, but became involved in the insurrection directed by Bolivar, to whose staff he was attached. After the return of peace, he not only resumed his ordinary work as professor, but he so threw himself into the investigation of the natural wonders of the new country as to gain a reputation as an explorer, second only to Humboldt. Returning to France in 1833 he was appointed Professor of Chemistry at Lyons, and from that time devoted himself to the study of the chemical problems of the soil and the atmosphere, with which his name will always be especially associated. Besides a number of separate treatises he also became the author of several standard works upon agricultural chemistry. In 1839 Boussingault was elected a member of the Academy of Siences, and at the time of his death was the senior member next to the centenarian Chevreul. In the troublous times of 1848, Boussingault gravitated towards politics and was elected a member of the Constituent Assembly, but the events of the 2nd of December sent him back to his studies and the duties of his chair at the Conservatoire des Arts et Métiers.

FRIEDRICH WOLFRUM.

The name of Friedrich Wolfrum, *apothecer*, of Augsberg, who died suddenly on the 15th of May, in the seventieth year of his age, is probably not familiar to many in this country, but for many years it has been an honoured one among German pharmacists. Before the Franco-German war which welded the Germans into one united nation, Herr Wolfrum for many years filled the office of President of the South German Pharmaceutical Association. After the formation of the German Pharmaceutical Association, Herr Wolfrum became its President in 1875 and continued in the office until 1879, when, although re-elected, he declined to serve and was succeeded by the present holder of the office, Dr. Brunnengräber. In 1878, during the meeting of the Association at Cologne, it fell to the lot of Herr Wolfrum to receive the German empress and act as her conductor during her visit to the pharmaceutical exhibition.

Notice has also been received of the death of the following:—

On the 14th of April, Mr. William Sanders, Chemist and Druggist, Darlington Street, Wolverhampton. Aged 75 years.

On the 30th of April, Mr. James John Harding, Pharmaceutical Chemist, late of Sudbury. Aged 61 years. Mr. Harding had been a Member of the Pharmaceutical Society since 1852.

On the 4th of May, Mr. John Woodward Lomas, Chemist and Druggist, High Street, Burton-on-Trent. Aged 72 years.

On the 6th of May, Mr. Samuel James Potts, Chemist and Druggist, Mansfield, Notts. Aged 52 years.

On the 8th of May, Mr. Robert Owen Steed, Chemist and Druggist, Wandsworth Road, S.W. Aged 42 years. Mr. Steed was an Associate in Business of the Pharmaceutical Society.

On the 12th of May, Mr. John Thomas Carpenter, Chemist and Druggist, Brigstocke Road, Bristol. Aged 48 years.

On the 15th of May, Mr. Sampson Dunn, Chemist and Druggist, Fore Street, St. Austell. Aged 53 years. Mr. Dunn had been a Member of the Pharmaceutical Society since 1869.

On the 15th of May, Mr. Henry Elliott, Chemist and Druggist, Kimberley, Notts. Aged 32 years. Mr. Elliott was an Associate in Business of the Pharmaceutical Society.

On the 19th of May, Mr. Thomas Noxon Bishop, Chemist and Druggist, Cradley Heath, Staffordshire. Aged 79 years.

ANSWERS TO CORRESPONDENTS.

Errata.—On p. 943, col. ii., in the paragraph relating to the emulsifying properties of Irish moss mucilage, lines 36 and 38, for "water ℥ij" read "water ℥ij."

F. C. Fawn is thanked for calling attention to the mistake.

A Minor Man is requested to forward his name and address.

C. H. Snell.—Your letter has been handed to the Secretary, who will probably communicate with you on the subject.

W. F. Quick.—(1) *Ajuga reptans.* (2) *Smyrnium olusatrum.* (3) *Lychnis diurna.* (4) *Chærophyllum sylvestre.* (5) *Brassica campestris.*

T. F. Walker.—*Valerianella olitoria*, Moench.

E. E. Rowland.—See a paper on "Aquaria for the Preservation of Leeches," in the first series of the *Pharmaceutical Journal*, vol. xv., p. 453.

J. Babb.—We have not found the colour of the mixture, when made according to the prescription with peppermint water, disappear in half-an-hour, nor in forty-eight hours, but the mixture very slowly deposits a yellow flocculent matter from decomposition of the cochineal colouring of the tinct. card. co. in the tinct. chlorof. co. When distilled water was used the colour became paler with a flocculent precipitate as above. It is impossible without examination to explain why there should have been a difference in the behaviour of the two samples of bromide of ammonium; but the bromide is no doubt an important factor, and plays an important part in the changes which take place. Probably the aq. destill. was not a good sample, and one or other of the samples of bromide could hardly have been B.P. Your letter of the 25th has been handed to the Secretary.

E. S.—If practicable the impossibility of dispensing the prescription exactly as written should be brought under the notice of the prescriber. But the difficulty may be less satisfactorily met by dissolving the pot. cit. ℥ij in five ounces of water with ℥iv of fresh mucilage of gum arabic; adding the tinct. quin. ammon. ℥ij and shaking the bottle. The quinine that would otherwise separate out is diffused, and will remain so a reasonable time.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Boa, Hill, Thompson, Wallbridge, Humphrey, Hodges, Pervell, Rowland, K. K.

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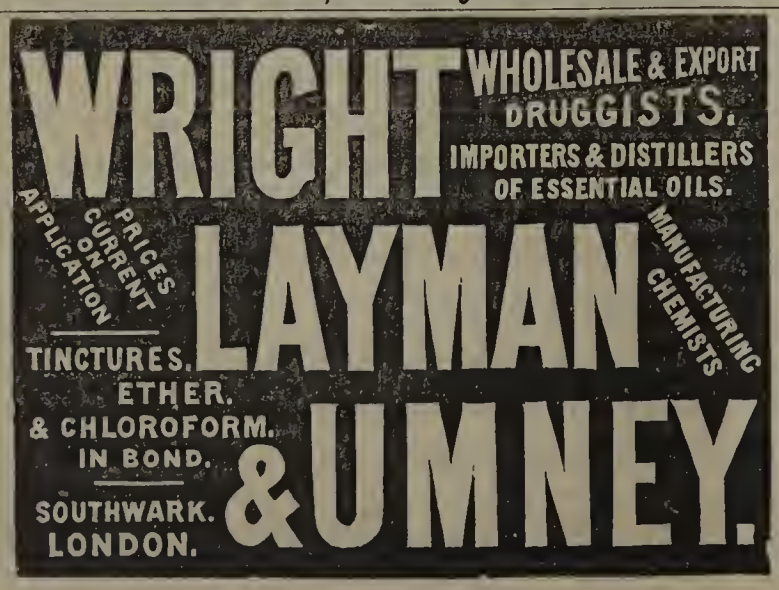

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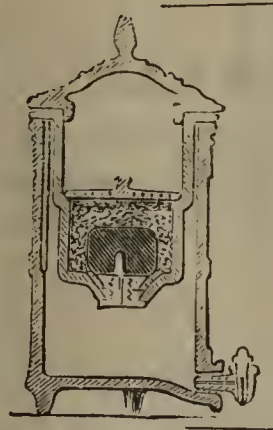

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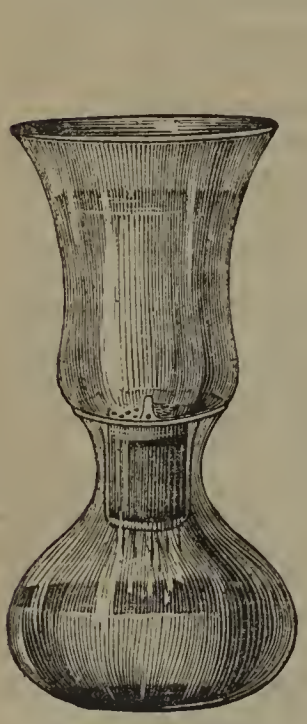

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The Pharmaceutical Journal AND Transactions.

THIRD SERIES, No. 884.] SATURDAY, JUNE 4, 1887. [PRICE FOURPENCE.

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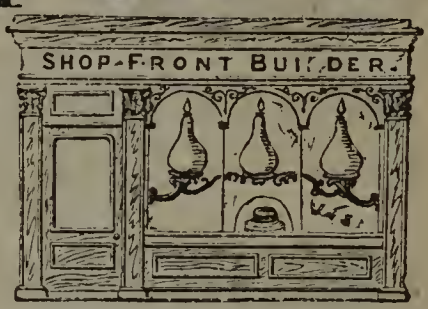

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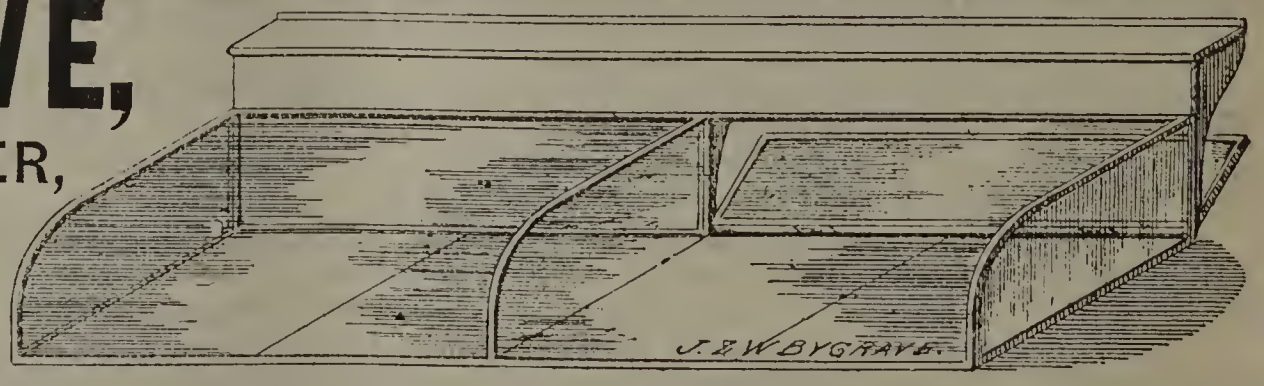

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THE DISTRIBUTION OF SAFROL.

BY PROFESSOR FLÜCKIGER.

The prevailing constituent of the essential oil of sassafras root is *Safrol*, as will be seen in the text-books; for instance, in 'Pharmacographia,' second edition p. 536. In the crude oil, safrol is held in solution by the hydrocarbon safrene, $C_{10}H_{16}$, and may be separated either by fractional distillation or by cooling the oil. Safrol liquefies at 12° (53°·6 F.) and yields very large and fine prisms, which I caused to be exactly investigated crystallographically by Professor Arzcuni, as mentioned in 'Pharmacographia.' The large crystals of safrol are very little softer than those of gypsum. Although they cannot be kept at a temperature exceeding their melting point, they were, curiously enough, known in England a century and a half ago.

As to the constitution of safrol it has been shown by Eykman* that by means of permanganate of potassium it yields piperonylic acid—

$$C_6H_3\begin{pmatrix}O\\O\end{pmatrix}>CH_2\Big)COOH,$$

safrol, therefore, may be represented by the formula—

$$C_6H_3<\begin{matrix}O\\O\end{matrix}>CH_2.$$
$$\diagdown C_3H_5$$

Piperonylic acid is obtained by oxidizing piperonal (now known, in perfumery, under the name of heliotropin)—

$$C_6H_3\begin{pmatrix}O\\O\end{pmatrix}>CH_2\Big)CHO$$

and Poleck† thinks that he has observed piperonal among the products of the treatment of safrol with permanganate of potassium, for the action of this salt on safrol is by no means very simple, 4 per cent. of piperonylic acid only having been obtained by Poleck.

Sassafras is not the only plant containing safrol. In the same natural order, viz., that of Lauraceæ, *Mespilodaphne Sassafras*, Meissner, a Brazilian tree, has a bark resembling safrol in odour. The same is also well known with regard to the Puchury nuts, or sassafras nuts, the cotyledons of two Brazilian species of Nectandra, a genus as yet very imperfectly known.‡

Again, the order of Monimiaceæ, tribe Atherospermeæ, closely allied to Lauraceæ, would appear to be provided with safrol. Of this at least the aroma of the Australian "sassafras bark" is strongly suggestive. This drug, which is not seldom seen in the London market, is the bark of *Atherosperma moschatum*, Labillardière, a tree indigenous to Australia and Tasmania. The bark of *Doryphora Sassafras* of New Caledonia, likewise of the order of Monimiaceæ—Atherospermeæ, also smells of sassafras.

Although there can be but little doubt as to safrol really occurring in all those essential oils of the just-named plants the fact has not yet been proved.

This, however, has been most surprisingly done by the well-known house of Schimmel and Co., of Leipzig, with regard to the oil of the camphor tree, *Cinnamomum Camphora*. Since 1885 the said house is manufacturing safrol from camphor oil to a very large extent. No doubt there is now much more safrol being made in the state of absolute purity at Leipzig than they are able to distil crude oil of sassafras in the United States.

Cinnamomum Parthenoxylon, Meissner, and *C. glanduliferum*, Meissner, the former tree belonging to the forests of Penang, Sumatra and Java (Kayu-gadis of the Malays), perhaps also in Tenasserim; the second in Nepal, Sikkim, Bhootan and Khasia ("Sassafras of Nepal"), are also known for their odour resembling that of true sassafras.* They would deserve of a chemical investigation.

I am struck, lastly, with the very strong odour of the same kind displayed by the bark of an Australian tree, which has been described by Bentham (assisted by Ferdinand Müller) in the 'Flora Australiensis,' vol. v. (1870), p. 299, under the name of *Nesodaphne obtusifolia*. It is a large and handsome tree, growing in Queensland, Rockingham Bay, Fitzroy River, Rockhampton, Archer's Creek (according to Leichhardt), also in New South Wales, Clarence River. Hooker and Bentham, 'Genera Plantarum,' iii. (1880), p. 152, ultimately unite the genus Nesodaphne to Beilschmiedia;† the tree under notice is, therefore, to be called *Beilschmiedia obtusifolia*, Benth. and Hook.

Dr. Joseph Bancroft, in his 'Contributions to Pharmacy from Queensland' (Colonial and Indian Exhibition of 1886, London), p. 11, states that the tree grows in the rich scrubs to the north of Brisbane. Its grey, rough bark, reddish-brown internally, has a strong aromatic odour and pleasant astringent taste, and is frequently used by bushmen to improve the flavour of their tea. The bark, according to Mr. Staiger, affords about 2 per cent. of volatile oil heavier than water,‡ and 9 per cent. of tannin.

Being indebted to Mr. E. Merck of Darmstadt, for a good sample of the bark of *Beilschmiedia obtusifolia*, I may state that it agrees, to some degree, in its microscopic structure both with the bark of cassia lignea and sassafras. The Beilschmiedia bark is as much as 15 millimetres (half an inch) in thickness, and shows the same exfoliation due to secondary cork bands (rhytidoma) as the bark of sassafras. Beilschmiedia bark is, on the other hand, much more fibrous than either of the above-named barks; its tissue being very rich in long thin fibres, and in its outer layer there are scattered, not in large number, sclerenchymatous cells, having comparatively thin walls. The oil ducts of Beilschmiedia bark are neither very numerous, nor considerably large. It remains to be proved that they really contain safrol as I venture to say.

In the natural system, the Magnoliaceæ are not much distant from both Lauraceæ and Monimiaceæ. Eykman, has shown,§ that safrol also occurs in the essential oil of the fruit of *Illicium religiosum*, the false

* *Recueil de travaux chimiques des Pays Bas.*, iv. (1885), 32, according to the "Referate" of the *Berichte der Deutschen Chemischen Gesellschaft*, Berlin, 1885, p. 281.

† *Berichte der D. Ch. G.*, 1886, 1096.

‡ See 'Pharmacographia,' 540. The statement found there to the effect that *Oreodaphne apifera* yields also an oil of the same odour is not correct, as I was informed in 1881 by a kind note from Mr. Holmes. "Aceite de Sassafras," from *Nectandra Cymbarum*, Nees., probably contains safrol.

* Waring, in 'Pharmacopœia of India.' London. 1868, 196.

† A genus of the order Lauraceæ-Perseeæ, devoted by Nees to the pharmacist Karl Traugott Beilschmied (1793–1848), of Ohlau, Silesia. See *Archiv der Pharmacie*, cviii. (1849), p. 126.

‡ Specific gravity of safrol=1·114 at 0° (32° F.).

§ *Pharm. Journ.*, xv. (1885), 985, short abstract of Eykman's paper in the *Recueil*, above mentioned.

star-anise of Japan; this tree belongs to the order of Magnoliaceæ. There the safrol is accompanied by eugenol, the formula of which

$$C_6H_3(C_3H_5)(OCH_3)(OH)$$

at once reveals its relation to safrol as also to anethol—

$$C_6H_4(OCH_3)(CH=CH-CH_3)$$

It would appear, therefore, that at least eugenol $C_{10}H_{12}O_2$ and safrol $C_{10}H_{10}O_2$ may be in some generic relation. The former has been met with by Stenhouse in the leaves of the cinnamon tree.* And, thirdly, anethol $C_{10}H_{12}O$, the chief constituent of the oil of true star-anise, *Illicium anisatum*, is there replacing safrol as occurring in the other variety.

It would be interesting to be able to convert one into the other of those three highly aromatic substances; their empirical formulæ: $C_{10}H_{12}O$, $C_{10}H_{10}O_2$, $C_{10}H_{12}O_2$ would apparently indicate the probability of such transformations, but not their structure.

RECENT DONATIONS TO THE MUSEUM.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

(*Continued from page* 903.)

American Sponges.

Cuban Sponges.—For specimens of this and of the Florida sponge the Museum is indebted to the kindness of Messrs. Cresswell Brothers, of 2, Red Lion Square, to whose courtesy is due also such commercial information concerning these sponges as I am able to give here.

According to Mr. Ernest Cresswell the Bahama sponges were first introduced into this country about fifty years ago, but were not then well received. A market for them, however, soon sprang up in France, and it was only when the Franco-German War broke out that the depression in the French trade led to the transference of the bulk of the Bahama sponge trade to Great Britain. During the last two years sponges have been imported also from Cuba to this country. These much resemble the Bahama varieties, but are relatively of finer mesh and stronger and more durable. The variety which is most esteemed is known as Cuban "*fine dure*" or "solids." It approaches the glove sponges in the density of texture and the reef sponge in the regular distribution of the few oscules on the upper surface. From both of these, however, it differs in the more flattened summit, the sponge having in consequence a more rounded outline, and is thus much more convenient to handle than the cup sponges. The specimen presented by Messrs. Cresswell Brothers is also of larger size than the Museum specimens of the Bahama glove sponges. It may, in fact, be regarded as the American equivalent of the Turkey solid sponge of the Mediterranean, of which it is only about one-quarter the price, and therefore cheaper than the Zimocca. Their specimen of the sheep's wool is equal in quality to the softest of the Bahama varieties, but seems rather tougher in fibre. The Cuban grass sponge, although not quite so soft as the Bahama specimens, seems to be less easily torn. The specimen of Cuban yellow is not easily distinguishable from the Bahama kind.

Florida Sponge.—This is almost the only cup-shaped sponge found in American waters. In structure it resembles the Turkey cup sponge, but is of coarser texture. It is often found in cups of tolerably large size, and is then cut up into flat pieces for the sake of convenience in toilet use. The Florida sponges have been imported into this country for about four or five years. They are chiefly collected in the neighbourhood of Key West. The specimen of Florida cup sponge presented by Messrs. Cresswell Brothers is a remarkably fine one, being nine inches high by twelve in diameter at the top of the cup. In hardness it approaches the Zimocca sponge. In the grouping of the oscules in the centre of the cup and in the shape it resembles the true Turkey cup sponge, but externally it presents a likeness to the grass sponge in the thin projecting tufts of fibre.

Of the above sponges, the finest varieties of the Bahama sheeps' wool and velvet and the Cuban "fine dure" are the best for toilet use, and the glove sponge for surgical purposes; the second qualities of sheeps' wool and velvet are most suitable for household and cleaning purposes and carriage use, and the yellow and the hardhead for painters' use and for washing walls, etc.

According to Sir Augustus Adderley,* the sponge fishery in the Bahamas gives employment to some thousands of persons and some hundreds of vessels. The vessels employed are small, having crews of only six to twelve men. Provisions for about six weeks are taken on board, and the vessels then coast along the banks and reefs where the water is shallow and generally so clear that the sponges are readily seen, and are brought to the surface by a sort of hooked fork, consisting of two shepherd's-crook hooks on a long pole. The day's haul is spread out on the deck so as to kill the gelatinous slimy mass of animal matter, which, in dying, emits a most unpleasant smell. To free the decaying matter from the fibrous horny skeleton, the sponges are taken on shore where the water is rough, and placed in a pen or crawl made of stakes, so that the softer portion may be washed away by the action of the waves and tide, this process being assisted by pounding the sponge with a piece of wood. When the sponges are thus freed from gelatinous matter, which usually takes about a week, they are strung on strips of palmetto, three or four to a strip, which is called a bead. They are then taken to Nassau to be sold in the sponge market, under certain conditions and regulations, no one being allowed to sell his cargo except through the sponge exchange. On the conclusion of the sale the sponges are taking to the packing yard, where they are sorted, clipped, soaked in tubs of lime water, and spread out to dry in the sun. They are then pressed by machinery into bales containing 100 lbs., and in this state are shipped to England or the United States.

According to Mr. Ernest Cresswell, the West India sponges are packed tightly in bales by means of lever pressure, the same means being used to give the bales a square or rectangular form, each bale containing usually about 70 lbs. Lately, however, small bales weighing about 20 lbs. have been introduced to suit the convenience of buyers who prefer to receive the sponges unbleached as imported. Turkey sponges are imported in cylindrical bales,

* 'Pharmacographia,' 527.

* 'Fisheries Exhibition Literature,' vol. v., pt. ii., p. 369.

which are formed by putting the sponges in a sack held by two men, while a third tramples them down, further pressure being obtained by placing a heavy stone on the top of the bale when filled. The bales of Turkey sponge usually contain 50 or 100 lbs. The value of the export of sponges in 1883 from the Bahamas was estimated at £60,000, the largest quantity being shipped to the United States, although a considerable export takes place to Great Britain. A gradual increase in the trade has taken place since 1874, when the exports amounted only to £16,000.

A few notes on the natural history and chemistry of sponge may perhaps form a useful appendix to the above remarks.

Commercial sponges are confined, so far as at present known, to the Mediteranean and Red seas, and to the waters of the Caribbæan islands, Bahaman archipelago and the South-west and West coasts of Florida. Australia, however, affords a few forms,* and others have been stated to be found on the Atlantic Coast of Brazil. Those of Bermuda, according to Mr. Hyatt, appear to be much coarser than those of Key West, and are just about intermediate between these and those of Australia.

The species show an extreme susceptibility to vary under any change in external conditions, the greatest number of forms and species being produced in tropical or subtropical seas, and occurring most abundantly in archipelagos, or off seas bordered by a number of islands or long reefs, where the floating food of the sponges becomes concentrated in channels between the islands ; a continuous current of aerated water and a plentiful supply of food being essential to sponge growth. Temperature also affects their geographical distribution, which appears to be limited by a minimum temperature of 55° F. ; sponges flourishing best where the average aerial temperature in winter is between 63° and 70° F. The nature of the bottom on which they are found also modifies their growth and properties. Mr. Saville Kent points out that no sponges of the finest quality have yet been found in seas productive of reef corals. Sandy or clayey bottoms and river sediment are also prejudicial, or any situation wherever there is much gritty matter suspended in the water ; the clearer the water the finer the fibre. The depth at which the sponges grow affects greatly the fineness of the threads and the strength and elasticity of the sponge. The best Turkey cup sponges are fished at a depth of not less than 8 to 30 fathoms, some being obtained from a depth of even 40 fathoms. In the American waters sponges are rarely fished below a depth of 5 fathoms. In Mr. Saville Kent's opinion it is possible that sponges equal to the finest Turkey varieties may yet be found in greater depths in the Bahamas.

The variation in the form of the sponge depends in some degree on the position and ramification of the oscules and upon the character of the base to which they are attached, and the force of the current to which they are exposed, and, possibly, also on the depth at which they grow. The cup-shaped sponges are found at the greatest depth. When growing on a sandy or muddy bottom they sometimes become loosened, and are known as "rollers," and are recognized commercially by their rounded bases and the dark tint of the lower half of the sponge.

The reproduction of the sponge takes place from the egg-like bodies which are found about midsummer in the interior of sponges, either aggregated in a sac or scattered through the tissue. Each egg contains, enclosed in a thin membrane, a substance corresponding to the yolk and another like the white of an ordinary egg. The egg increases in size by segmentation of its contents, becomes oval in shape, forms a covering of delicate cilia, and then swims about, ultimately settling down, and developing cells at the lower end, which become fixed to the rock, when the upper end develops in the form of a nipple, and the cilia fall off. The lower end gradually spreads over the rock, the nipple becomes depressed and ultimately perforated ; this perforation forming the first oscule or excurrent aperture, smaller incurrent openings or pores being formed around it. The development of amœbiform particles, and the deposit of fibre leads to the multiplication of oscules and pores, or, in other words, to a colony of individuals resembling the first, but connected intimately with each other. The fibres which are formed around the oscule in a more or less vertical direction are called the primary fibres, and those which connect the fibres together, and which appear to originate from the primary fibres by a process of budding, are known as the secondary fibres.

In the living sponge the primary fibres are found to shade off like the mouth of a trumpet into the gelatinous membrane which forms the outer surface of the sponge. The fibre itself consists of concentric layers made up of fine fibrillæ. These may often be observed at the broken end of the fibres under the microscope. In some localities the dermal or exterior membrane of the sponge is loaded with foreign matter, which by the growth of the sponge becomes drawn into the trumpet-shaped end of the fibres, and ultimately imbedded in their substance.* Much of the brittleness and coarseness of fibre of inferior sponges is due to this cause, and in some degree the dark colour also, although this is also due to too cold a temperature and an unfavourable situation, as in shallow water. The reason that the secondary fibres are not usually gritty is evident from their not coming in direct contact with the external membrane, so that foreign matter cannot readily enter their structure.

The fibre or keratose of which the sponge skeleton is formed contains as a principal ingredient a substance named spongin, resembling the fibroin of silk in its composition, but differing from it in not yielding tyrosine when heated with sulphuric acid, but only glucosine and leucine.† It is insoluble in alcohol, ether and ammonia, but is dissolved slowly by strong alkalies, and is reprecipitated by dilute acids, but only concentrated acids attack it.

The method of bleaching sponges has already been described (*Pharm. Journ.*, [3], xiv., p. 88, and xv., p. 85). The strength of sponges does not appear to be affected much by the process, the brittleness of sponges depending much more upon the structure of the original sponge.

* It has been suggested that the coast of Queensland, inside the great boundary reef, must be exceedingly favourable for the growth of sponges.

* Hyatt, 'Revision of the North American Poriferæ,' part ii., p. 482.

† Stadeler, *Am. Chem. Pharm.*, cxi., 12.

The Pharmaceutical Journal.

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SIR DOUGLAS MACLAGAN ON PHARMACEUTICAL EDUCATION.

SINCE calling attention to the reports of the Government Visitor of Examinations in London, which were laid before the Council at its meeting in April last, a further report on the pharmaceutical examinations in Edinburgh has been forwarded from the Privy Council, and will be found at p. 1002 of the present number. It relates to a period extending from the early part of the year 1883 down to January, 1886, and in regard to the general character of the examinations, Sir DOUGLAS MACLAGAN again expresses an opinion in accordance with that so often expressed by Dr. GREENHOW as to these examinations constituting a satisfactory test of qualification to undertake the duties of chemists and druggists. On this point there has always been a perfect agreement between the officers who represent the Privy Council at the examinations, and so far as the welfare of the public is concerned their repeated testimony that those who pass the examinations possess the requisite practical skill and knowledge of their business may be taken as conclusive evidence that in this respect the provisions of the Pharmacy Acts have been efficiently and beneficially carried out. We have only recently had occasion, in speaking of Dr. GREENHOW'S reports for the last two years, to point out that as regards the candidates who present themselves for examination, he is of opinion that no undue stringency is exercised, but that the action of the examiners is uniformly characterized by fairness and impartiality. The same view is expressed also by Sir DOUGLAS MACLAGAN in the report now presented, inasmuch as he finds the decisions of the examiners to be justly apportioned to the quality of the answers given, while the interests of the candidates meet with due regard. These concurrent expressions of opinion are of especial importance at the present time, when there is a tendency in some quarters to suggest that candidates are sometimes harshly and even unfairly dealt with, and though the opinions of the Government Visitors of the Examinations do not in any degree differ from those hitherto expressed by them in this respect, it appears desirable to point to them as thoroughly disposing of the complaints that have been put forward on grounds which are obviously inadequate. The accounts given by unsuccessful candidates of the circumstances which they imagine to have been the cause of their rejection cannot safely be relied upon as furnishing a correct representation of the case, and in the face of the contradictory evidence, afforded by the reports of impartial authorities, acting as the Government Visitors of Examinations, it may, we think, be regarded as certain that such accounts are likely to be exaggerated and incorrect.

In the report now presented to the Privy Council by Sir DOUGLAS MACLAGAN, attention is especially directed to the results of the examinations in Edinburgh, as shown by the large proportion of failures, both in the Minor and the Major examinations. Upon the basis of the returns for the three years referred to, there is again occasion for stating, as had previously been stated, that a large number of candidates present themselves ill-prepared for satisfying the just requirements of the examiners. Not only is this still the case, but on comparing the returns with those relating to the previous three years, it appears that the number of such ill-prepared candidates is actually increasing so much as to indicate on the part of candidates, and of the persons who are responsible for their training, a deplorable ignorance of what is to be expected from those who desire to obtain a pharmaceutical qualification. Sir DOUGLAS infers from the facts which he has observed in visiting the examinations, that as regards pharmaceutical education very serious deficiencies exist which leave candidates without any adequate appreciation of the means of qualifying themselves. In connection with this point we may refer to a statement in one of his former reports bearing upon the subject of apprenticeship. On that occasion he gave it as his opinion that to a large extent members of the pharmaceutical profession do not do their duty properly to their apprentices. This is a grave charge, but it was supported by reference to the failures in the subjects of dispensing and pharmacy, and it was urged that if the apprentice is to learn only the routine duties which fall on anyone standing behind a counter, the three years' term of apprenticeship might be abolished with advantage. As is well known, Dr. GREENHOW strongly advocates adherence to the system of apprenticeship as a means of pharmaceutical education, but he does so on the assumption that it affords an opportunity of acquiring practical acquaintance with drugs and manipulative skill in compounding them. It is from this view of the advantages of apprenticeship that he has always expressed regret that a compulsory apprenticeship was not made necessary by the Pharmacy Act. If, however, young men during their apprenticeship do not learn pharmacy and dispensing, we can well imagine that he would agree with his colleague, Sir DOUGLAS, in asking what good purpose is served by apprenticeship.

This subject of apprenticeship appears to be one

that demands careful attention on the part of all connected with pharmacy. There can be no doubt that the arguments put forward by Dr. GREENHOW in favour of the system have great force, and that, provided proper facilities are afforded for gaining the knowledge and practical skill which long and constant practice is best able to confer, there can be no better form of pharmaceutical education. A correspondent in this week's Journal well insists upon the obligation of those who take apprentices to instruct them fully in their art, and he contends that the deficiences which are expressed by failures to pass the examination are less due to unwillingness on the part of apprentices to learn and to be taught than to the neglect of their masters to give them the training they require. Much has been said at various times about the difficulty of obtaining apprentices, and the probability that this was being enhanced by the supposed increase in the stringency of the examinations. We have never seen any reason for regarding these complaints as well founded, and Sir DOUGLAS MACLAGAN'S report will, we think, show very clearly that the cause of any difficulty that may exist in obtaining apprentices may more reasonably be sought for in other directions. We trust that the discussion of this important subject, which has been started by Mr. HUMPHREY, will be taken up by others, and that it may have the effect of establishing a better state of things under which the period of apprenticeship may justly be looked upon as constituting an indispensable and most valuable part of the pharmaceutical curriculum.

The retirement of Mr. Williams from the seat on the Council which he has now filled for some eighteen years will doubtless be learnt with deep regret by everyone who is aware of the laborious zeal with which he has served the Society in the various capacities of member, member of Council, Treasurer, and President, and by which he has acquired a claim to the gratitude of all connected with the Society and with the trade at large. That feeling of regret will certainly be enhanced by the knowledge that the state of his health renders it impossible for him to continue such active participation in the work of the Council as he deems to be now necessary on the part of a member resident in London. We feel sure that the tribute of esteem expressed for him by his late colleagues will be re-echoed throughout the country, and that the good wishes expressed towards him will be as widely endorsed.

* * *

The retirement of Mr. Borland will also be a cause for regret, not only in Scotland, but also on this side of the Tweed, where his able services and amiability were equally well appreciated. Fortunately, in his case there is no more serious reason for retirement from official duties than want of time; but we trust that both Mr. Williams and he may long be enabled to watch with satisfaction the progress of the work to the promotion of which they have both contributed so much.

It will be seen from the report of the discussion at the recent meeting of the Council, that the list of subscriptions and donations in response to the special decennial appeal for the Benevolent Fund will be kept open for two months longer. Remittances should be sent to the Secretary, Mr. Richard Bremridge, and they will be acknowledged in a supplementary list that will be published in this Journal. The kindly award of a "Jubilee" gift of five pounds to each of the annuitants and to the unsuccessful candidates at the last election will doubtless commend itself to the friends of the Fund, and it may be hoped that such approval will result in some special contributions towards meeting the expenditure of £240 involved in carrying out the resolution of the Council. In fact there would be no difficulty in raising the entire sum were the example of Mr. Allen in canvassing the chemists and druggists of his immediate neighbourhood followed in other localities. We feel sure that, in a very large number of instances, it needs only some personal effort on the part of local secretaries or others in order to obtain a very material addition to the Fund.

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We are able to state that the sum of nineteen guineas has been received as a legacy to the Benevolent Fund, under the terms of the will of the late Mrs. Eleanor Hallows, widow of Mr. William Ayscough Hallows.

* * *

The Pharmacopœia Committee appointed by the General Medical Council at its recent session consists of Dr. Quain (Chairman), Sir Dyce Duckworth, Dr. Aquilla Smith, Sir Walter Foster, Mr. Brudenell Carter, Mr. Collins and Mr. Macnamara.

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Some of our readers whose interest extends to the more curious constituents of the materia medica may be glad to have their attention directed to an article in the new number of the *Contemporary Review* on "Strange Medicines," by Miss C. F. Gordon Cumming. The article has its ostensible origin in a *rencontre* with some of the crude remedies of Japan that are fast being displaced under the influence of Western scientific methods, but the authoress has extended the range of her observations sufficiently to demonstrate that any assumed superiority of European medical practitioners in respect to the remedies they now employ depends rather upon an earlier emancipation from the incubus of coarse and disgusting customs than upon any great dissimilarity in experience.

* * *

The first annual dinner in connection with the Brighton Association of Pharmacy is to take place on Thursday next, the 9th inst., in Booth's Restaurant, East Street, at 8 p.m., when Mr. W. D. Savage, J.P., will preside. We are requested to say that tickets may be obtained from the Honorary Secretary, Mr. Marshall Leigh.

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A meeting of the London Section of the Society of Chemical Industry will be held on Monday, the 6th inst., when papers will be read on "The Alkaloids—the Present State of Knowledge concerning them, and the Method employed in their Investigation," by Dr. H. E. Armstrong; and "Notes of a Recent Visit to some of the Petroleum-producing Territories of the United States and Canada," by Mr. Boverton Redwood.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, June 1, 1887.

Present—Messrs. Allen, Atkins, Baildon, Bottle, Carteighe, Cross, Evans, Gostling, Greenish, Hampson, Hills, Newsholme, Radley, Richardson, Robbins, Savage, Schacht, Southall, Symes and Woolley.

Mr. MICHAEL CARTEIGHE took the chair.

The minutes of the previous monthly meeting, and of the special meeting on May 18, were read and confirmed.

ELECTION OF OFFICERS.

Mr. BAILDON, as a comparatively young member, asked whether there was any reason why names should not be proposed. Of course, while every member of the Council was eligible for the offices of President, Vice-President, etc., there were practically only a limited number who would be able to perform the more important duties, and he would suggest that those who were able and willing to perform them should be announced, so that members might not throw away their votes.

Mr. CARTEIGHE said the plan hitherto followed of voting by ballot was that which generally prevailed under similar circumstances. No nomination was required, each member being, in fact, nominated, and it would be extremely invidious to mention anyone specially. It was quite true, as had been said, that some gentlemen were not in a position to discharge the duties of President; but he could conceive of the Council electing a gentleman as a compliment, although it might not be sure of his being able to serve.

Mr. EVANS asked how long the late President had held office, and whether it was the custom to re-elect, or to make a fresh choice, because, as a new member, he should wish to act in accordance with the usages of the Council.

Mr. ATKINS, as a country member, wished to point out that the choice of President was practically restricted to the London members, no one else being able to fulfil the constant and arduous duties which devolve upon the head of the Society.

Mr. CROSS thought it very probable that if a nomination were made, the choice would be unanimous, and that such a method would be more in accordance with public business generally. He cordially seconded Mr. Atkins's remarks, for no country member could perform the onerous functions which devolved on the President.

Mr. WOOLLEY entirely disagreed with the remarks of Mr. Baildon and Mr. Cross, as to the present mode of election not being in conformity with that generally followed in public bodies. All those with which he was connected elected their officers in the same way. With reference to Mr. Evans's question, if he would refer to the Calendar he would find that Mr. Michael Carteighe was elected President in 1882 and had held that office ever since.

ELECTION OF PRESIDENT.

The ballot being then taken,

MR. MICHAEL CARTEIGHE

was re-elected President.

The PRESIDENT thanked the members most cordially for this renewed mark of their confidence. If he had consulted his own feelings, he should have been glad to see one of his colleagues buckle on the armour and set himself to the work, but he was bound to accept the vote as a command to do his best for the interests of the Society. In conformity with that command he accepted the position with every mark of gratitude, and with the assurance that he could rely on the friendly co-operation of all his colleagues on the Council.

ELECTION OF VICE-PRESIDENT.

On a ballot being taken—

MR. THOMAS PRESTON GOSTLING

was re-elected Vice-President.

The VICE-PRESIDENT thanked the Council for the honour conferred upon him. The work he had had to do during the past year had been exceedingly interesting, and he had had the advantage of working with a President who was exceedingly active, diligent and competent. For some time he had been unable to attend regularly, owing to ill-health, but he received every consideration from the President and Secretary, and he hoped during the coming year he should be able to give all the time and attention which were required.

ELECTION OF TREASURER.

A ballot having been taken—

MR. JOHN ROBBINS

was re-elected Treasurer for the ensuing year.

Mr. ROBBINS thanked the Council for the honour it had again conferred upon him. He feared the Treasurer in future would not be able to show such good balances as in the past, but he was satisfied that the outlay which was being made in the direction of a building for a research laboratory and other purposes would do more to increase the influence and usefulness or the Society than if the money were left to accumulate.

HONORARY MEMBERS.

Letters of acknowledgment for election as Honorary Members had been received from Sir Henry Acland, Professor Fraser, Professor Ladenburg, Professor de Bary, Dr. Brunnengräber, Professor Pasteur, Dr. Méhu, Dr. Lauder Brunton, Mr. von Waldheim, Mr. Thiselton Dyer and Professor Maisch.

A resolution was passed authorizing the seal of the Society to be affixed to the certificates of membership to be forwarded to the Honorary Members.

VOTING PAPERS.

Mr. RICHARDSON drew attention to the fact that seventy-four voting papers had been rejected through having been received too late, and suggested that the notification should be made more explicit that they must be received on the Monday before the Annual Meeting in order to comply with the provision of the Bye-law that they must be received "one clear day" before the election. Many voters thought that if the votes were delivered on the Tuesday morning it was sufficient. Pharmaceutical chemists could not be considered illiterate voters, and it was rather hard that seventy-four gentlemen should be disfranchised through a misunderstanding.

The PRESIDENT said he thought the voting papers were in the form prescribed by the Bye-law, which could not well be altered.

Mr. SYMES remarked that this matter had been discussed on two or three previous occasions, and he thought all were agreed that an alteration in the rule was desirable if it could be accomplished, and that voting papers might be received up to the day of election, but it could not be altered at present. At the same time if there were any means of making the present regulations more clear they should be adopted.

Mr. ALLEN, as a scrutineer on more than one occasion, said this question had several times arisen, and it had over and over again been pointed out that under the present Act of Parliament there was no option, though the "one clear day" provision, requiring voting papers to be received on Monday evening, sometimes worked hardship, owing to the Sunday postal regulations.

The PRESIDENT, having sent for a copy of the voting paper and the envelope sent with it, said he thought everything had been done to make the regulation clear.

Mr. HAMPSON said he supposed it would not be

possible to introduce a clause into the Bill now before Parliament to allow of votes being received up to the time of counting.

Mr. RICHARDSON suggested that the same words should be put on the voting papers as appeared on the envelopes, stating the day by which they must reach the office.

The PRESIDENT remarked that the number of voting papers rejected was not very large, considering that more than half the members did not vote at all. The object of the provision in the Bye-law was, no doubt, to prevent the possibility of a member voting twice. If all the voting were by post it would be quite simple; but as members had the option of attending and voting personally, it was thought desirable, at the time the Bye-laws were framed, to guard against the possibility of two votes being given, one personally and one by post.

The SECRETARY said votes were often received after the election was over.

STANDING ORDERS.

The Standing Orders of the Council were re-enacted for the ensuing year.

APPOINTMENT OF SECRETARY AND REGISTRAR.

Mr. RICHARD BREMRIDGE was re-appointed Secretary and Registrar for the ensuing year.

APPOINTMENT OF EDITOR AND SUB-EDITOR OF THE JOURNAL.

Dr. B. H. PAUL was re-appointed Editor and Mr. F. PASSMORE Sub-Editor of the Journal for the ensuing year.

APPOINTMENT OF CURATOR.

Mr. HOLMES was re-appointed Curator of the Society's Museum for the ensuing year.

APPOINTMENT OF ASSISTANT SECRETARY.

Mr. J. R. HILL was re-appointed an Assistant Secretary of the Society.

LOCAL SECRETARIES.

It was resolved that the nominations for Local Secretaries be referred to the Library, Museum, Laboratory and House Committee.

The Secretary reported that last year there were 321 towns entitled to Local Secretaries. Five towns had been added to the list this year and two had been removed. There were now 324 towns entitled to have a Local Secretary, from 201 of which votes had been received, leaving 123 towns which had sent no nomination.

Mr. RICHARDSON asked if there had not been some discussion about the mode of electing the Local Secretaries.

The PRESIDENT said a resolution had been passed last year referring the question to the Committee, and it was very carefully considered at three meetings, but in the result it was decided that no change could be made with advantage.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Barrett, Arthur Albert .....Birmingham.
Blackburn, Albert Edwd. Hy...Eccles.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Ellithorne, Arthur Henry .....Liverpool.
Filmer, John Honeywood .....Plymouth.
Hay, James .....Alford.
Jamieson, Simpson .....Cupar-Fife.
Jones, Ebenezer Owen .....Plymouth.
Loveday, Francis John .....Ryde, I.W.
Maynard, Henry Robert..... London.
Wheeler, William Robert .....Upper Norwood.

ASSOCIATES.

The following, having passed the Minor examination and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Allen, Richard .....Ramsey.
Duplock, Walter .....Petersfield.
Humphrey, John Thurlbeck ...Sunderland.
Jago, Richard Edwin .....Glasgow.
Milbank, Sydney Thomas .....Bishop Stortford.
Northey, Edward John .....Truro.
Rutter, Clement Thomas .....Birmingham.
Stanley, James.....Bulwell.
Tonking, Wm. Oliver Hoskin...Camborne.
Viggars, George Daniel .....Stafford.
Wilson, John Grant .....Edinburgh.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Ashfield, Armishaw.....Stratford-on-Avon.
Boreham, Walter Herbert .....Lee.
Care, Harry Bristow .....London.
Cundall, Thomas Bowser ... ..Pocklington.
Dale, John Graves .....Stockton-on-Tees.
Davies, Richard .....Kidderminster.
Duck, William George .....Cardiff.
Dunn, Harold Stables.....York.
Everett, John Garwood .....Ipswich.
Golden, Alfred Percival ... .Leicester.
Grayson, William Henry .....Kidderminster.
Hall, Charles Albert .....Peterborough.
Hughes, Richard .....Aberystwith.
Lucas, Edward William .....Ashbourne.
Macdonald, Reginald Edward...Edinburgh.
Metcalfe, Arthur Pollard .....Doncaster.
Morris, David .....Kidwelly.
Parry, Joseph .....Towyn.
Peers, Thomas Henry Parkes...London
Punch, James .....Sedbergh.
Reeve, George Dunn Reeve ...Portsmouth.
Salmon, Thomas William .....Stockton-on-Tees.
Shankland, David .....Govan.
Stratford, Horace Oliver.....Margate.
Taylor, Herbert Henry ..... Rugby.
Todd, Edwin.....Carlisle.
Turner, Charles Getting ..... Shirley.
Whitaker, William .....Accrington.
Whitwell, Frederick William...Peterborough.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

ADDITION TO THE REGISTER.

The Registrar reported that—

John Strawson, 80, Grange Road West, Birkenhead, having made a statutory declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been duly supported, his name had been placed on the Register.

RESIGNATION OF MR. JOHN WILLIAMS.

The PRESIDENT read the following letter from Mr. John Williams:—

"*May 30th*, 1887.

"My dear Mr. President,—It is with extreme regret that I feel compelled to retire from the Council of the Pharmaceutical Society of Great Britain, and shall feel

much obliged if you will inform the Council of my resolution.

"I have been led to take this step by several considerations, but mainly, I may say, by considering the result of the last election of members of Council. I observe that the number of London members is becoming dangerously small, when we consider how important it is for the well-being of the Society that such members, who must of necessity be relied on to do most of the detail work, should be sufficiently numerous, and should also be ready, capable, and willing to do such work effectively.

"My health is unfortunately so bad that I feel it will not be possible for me to undertake my proper share of the duty, and thus by remaining on the Council I should really be keeping out some other more capable, although, perhaps, not more zealous, man who would be willing to sacrifice time and care to the general good.

"It is not for me to dictate to the Council who should be my successor, but I trust whoever it may be he will ever have the best interests of our body at heart. I need hardly add that it is with great pain that I have brought myself to place my resignation in your hands, but after mature reflection I have come to the conclusion that it is the proper thing for me to do, and can only add that if at any future time it is in my power to aid or advance the cause of pharmacy or of the Pharmaceutical Society I shall be most happy to do my best.

"I shall ever look back upon my connection with the Council as one of the happiest and most honourable periods of my life, and cherish the memory of the many men with whom I have had the pleasure of associating. With the highest esteem and warmest friendship,

"I remain,

"Yours very truly,

"JOHN WILLIAMS."

The PRESIDENT said Mr. Williams had been asked to reconsider his decision, but had declined to withdraw the letter, therefore he proposed to move a resolution expressing the regret of the Council at his resignation, and recording some of the work he had done for the Society. He should himself propose the resolution, as President, though of course he did not wish to prevent other members speaking upon the subject. He happened to be on the Council some twenty years ago when Mr. Williams first took a seat there. He sat as his colleague for some years, and of late especially had been in close contact with him. For three years Mr. Williams filled the office of Treasurer, and for another three years that of President, and altogether he had been for about seventeen years a member of the Council. During the whole of that time there was no member of the Council who had been so honorably independent or so emphatic in doing his best from his own point of view for the benefit and welfare of the body politic. Sometimes perhaps his manly independence had caused a little chafing among his colleagues; but in these days, when people were apt to get too much like machines, one ought to pay due and proper respect to individuality of character. As a London member he might say that Mr. Williams's time, as well as large sums of money for benevolent purposes, had been given to the Society unstintingly, and his interest had always been of the highest. His anxiety was that the Society should promote education in the widest sense, that it should take care not to move in any direction which might be looked upon as the protection of trade interests merely, but that it should always move on the lines of doing public good at the same time. This view he was sure would impress them all on looking back upon what Mr. Williams had written and said. Mr. Williams held that view very strongly, and was sometimes a little timid with regard to the action of the Council from this cause, but all who had been his colleagues—and many there had been his colleagues uninterruptedly for the seventeen years during which he held a seat at the Board—would be glad, whilst expressing their regret at his retirement, to bear testimony to the high esteem and affection in which he was held. The fact that Mr. Williams, one of the early students of the Society, had grown up to become a member of the Council, and was now retiring simultaneously with Professor Bentley, seemed to show that the Society was beginning to have a history. He begged to move—

"That the members of this Council desire to express their regret that their esteemed colleague, Mr. John Williams, has resigned his seat as a member of Council, and wish to record their sense of the great value of the services he has rendered as President of the Society for three years, as Treasurer for three years, and as a member of the Council for nearly seventeen years. They would further express the hope that the Society, in its efforts to promote the best interests of pharmacy, may still receive his advice and assistance."

The VICE-PRESIDENT had great pleasure in seconding the motion. His knowledge of Mr. Williams had been considerable during the last nine or ten years, and from the time of his first coming on the Council he had been particularly struck with the deep interest that gentleman took in the welfare of the Society, by his extreme courtesy to every member, and by the carefulness with which he pursued every work he undertook. He was much struck during his early experience of the Benevolent Fund Committee with the very great carefulness Mr. Williams exercised in considering every application for relief, and also with the great concern which he exercised towards the applicants, always bearing in mind the fact that the Benevolent Fund was really a Benevolent Fund, and that the Committee was not always called upon to take into consideration all the circumstances which rendered it necessary that an applicant should come for assistance. Unfortunately, many did come to grief, but the true benevolence of Mr. Williams's heart was so remarkable that he personally benefited by his intercourse with him. He felt that in every sense the Society was losing a great friend and supporter and a loyal member of the Council. He hoped Mr. Williams might still live for many years, and be able to give the assistance he was sure he would be glad to do when opportunity offered.

Mr. SAVAGE could not allow the motion to pass without saying a word or two. It had been his privilege to work with Mr. Williams when he was President, but it was not necessary to say a word on his behalf, so much were his good qualities appreciated. Mr. Williams entered the Council in 1868, and had really been eighteen years connected with it; a long period in any man's life, but the longer they had him the more they esteemed him, and the greater would be their regret at separating from him.

Mr. ATKINS said it was only fitting that he should say a word in supporting the testimony borne to the excellence of Mr. Williams's work. It was a recognition which a faithful servant on retiring from work might well receive from his colleagues. He agreed with every word the President had said about Mr. Williams's independence of character, which he had always greatly admired, even when he had dissented from his views. Mr. Williams was a man of great liberality in more senses than one; his time had been given, not as a retired man of business, but time which had been costly to him, being in the full swing of commercial life. He was a man who was connected with other scientific bodies, and was held in much respect by them as a scientific worker outside pharmacy. He was a man of strong common sense and of all-round faculty. As the Vice-President had said, the Council had sustained a very great loss in his retirement, and the least it could do was to express its great appreciation of his work and great regret at losing him.

Mr. BOTTLE could not allow the motion to be put without expressing his own sense of the loss the Council suffered by Mr. Williams's removal. The only redeeming feature about the matter was a feeling of satisfaction that he was

consulting his own health in this step. They all knew that he had many times been at work there when consideration for his own condition would have kept him at home. Mr. Williams had been an active worker in the interests of the Society, and a most independent one, and though he (Mr. Bottle) had occasionally had to differ from him it had always been with a feeling of the greatest respect for his opinion. He hoped that Mr. Williams would be spared to enjoy many years of life, and that they might have the privilege on many occasions of meeting him there and elsewhere, and of obtaining his advice in the conduct of the business.

Mr. HAMPSON said they would all feel that in losing the presence of Mr. Williams they had lost a very dear friend, and a serious gap was made in the Council Board by his retirement. It was unnecessary to say anything about his good qualities as a member of the Council, and they would all agree in expressing a hope that his health might be improved, and that he might continue to give them the benefit of his counsel and advice.

Mr. ROBBINS also wished to express his very great regret at the loss the Council had sustained. It had been his pleasure to have known Mr. Williams at the Council for a number of years, and to have worked with him on various committees ; he had also valued him very much as a personal friend, and had not failed to notice his great ability in various branches of science as well as his great earnestness in the work of the Society. There was no more conscientious member of the Council, and none more zealous to promote the best interests of the Society.

Mr. RICHARDSON said he must also add his regret at the loss the Council had sustained. He had had many years of friendship with Mr. Williams which led him to appreciate his great value as an adviser of the Council. He regretted his absence, particularly as Mr. Williams and himself were the only members of Council who had consistently opposed the alteration of the mode of investment of the Society's funds, and he now stood alone as an opponent of that scheme. Besides being a very honoured colleague at the Board, Mr. Williams, by his capacity, had built up a business firm second to none in the country for its high moral standing, and in that capacity he had known him many years, and all his business transactions were creditable to the firm he so ably represented. The Vice-President had alluded to one prominent trait in his character, his hearty benevolence, and to the fact that his heart was ever open, even to those who could not show a clean bill of health when they applied for assistance; in fact, he seemed to carry out the words of the poet—"Be to my faults a little blind, and to my virtues very kind." He sincerely hoped Mr. Williams would have better health in his retirement, and that they might still occasionally see him amongst them.

Mr. HILLS, as a young member, though it was hardly necessary to add anything, wished to say how thoroughly he agreed in what had been said that in Mr. Williams's retirement the Council had lost a man of great independence of thought, of very considerable scientific attainments, and of great generosity. He trusted that Mr. Williams would live many years to aid the Society with his counsel.

Mr. GREENISH said he had been on terms of intimate friendship with Mr. Williams for twenty years, and for fifteen of those he had been a member of the Council. He did not know a man whom he more highly appreciated. Mr. Williams had the courage of his convictions ; he was an independent minded man, and though he might have been wrong on many occasions, he always spoke from strong convictions and always spoke with firmness. Mr. Greenish added that he felt that Mr. Williams's absence would be a permanent loss to himself, and that the Council would have some difficulty in filling up his place.

Mr. SYMES said he hoped it would be understood that those gentlemen who had not spoken fully appreciated the merits of Mr. Williams, and the loss the Council had sustained.

The PRESIDENT, in putting the motion, said he was quite sure he expressed the feeling of every member, even the new ones, when he said that those who had not risen to speak had the same feeling of regard for Mr. Williams as those who had.

The motion was then carried unanimously.

THE RETIREMENT OF MR. BORLAND.

The PRESIDENT said he had another resolution to propose of a similar character, viz. :—

> "This Council regrets that Mr. Borland was unable to accept nomination for re-election as a member of Council, but hopes that his retirement is only temporary, and that it may have on a future occasion the benefit of his valuable assistance in its deliberations."

The Council had always considered such a step as that taken by Mr. Borland as tantamount to retirement from the Council, and had usually thought it becoming to have a resolution on the minutes expressing its value of the retiring gentleman's services. On this occasion he did not wish to trespass on ground which might be fairly occupied by some gentleman north of the Tweed, though it so happened that they had not now a Scotchman on the Board, but he might perhaps be able to throw a little enthusiasm into this proposition, for these reasons. He had been thrown into contact with Mr. Borland officially and semi-officially for some years. He had had the pleasure of meeting him in the north in the examination room some years ago, when a member of the Board of Examiners for Scotland, and had a knowledge of the high respect and esteem in which he was held by those competent to form an opinion in Edinburgh at that time. Mr. Borland was very much like Mr. Williams, a man who was an excellent pharmacist, a good botanist, a good microscopist, and interested in every branch of science. He was perpetually working as a student, and whilst he possessed knowledge of a high scientific order he was not ashamed to do the most menial work in his pharmacy, and encourage everybody to put his hand to the plough. He could suggest no reason for his retirement except want of time. No doubt the claims the Council had to make on those who lived a long distance from London were very considerable. It was a thing which those who lived in London could hardly realize. It often involved for those who came long distances two nights' travelling in one week, and very often two hard days' work, which was no light matter once a month, and he could well understand that Mr. Borland might feel it necessary to save himself for a time from the fatigues incidental to these duties. His services both as a member of the Board of Examiners in Scotland and on that Council deserved warm recognition, and the members of Council would be pleased to find him once more amongst them by and bye. At any rate the experience they had gained of him as a colleague would lead them all to hope that such might be the case.

The VICE-PRESIDENT had great pleasure in seconding the motion. Having sat by the side of Mr. Borland for several years as a member of the Council he had formed a very high opinion not only of his knowledge, but also of his general good qualities. He was a kind friend, a clever pharmacist, and a loyal member of the Council.

Mr. BAILDON said he could hardly say he had pleasure in supporting the motion, because he much regretted the necessity for it. It was to him almost a thunderbolt when he received a note from Mr. Borland saying that he had decided not to stand again for the Council. The words of the President had possibly fallen short of the truth, for Mr. Borland was a man of very exceptional culture and ability, and would furnish a most excellent model of what a pharmacist ought to be. As regarded the reasons of Mr. Borland's resignation he understood they were those which had been stated, viz, that his business

engagements were such that he had not the time to devote to the Council, and he also felt the great strain which the frequent night journeys from Scotland involved. He was quite sure Mr. Borland appreciated the honour of being on the Council, and it was a matter of great regret that they were no longer to be represented by him.

The motion was then carried unanimously.

Appointment of Committees.

Mr. Allen suggested that it would be well if the President gave some explanation of the work of the various Committees for the benefit of the new members. The Library, Museum, Laboratory and House Committee had a great deal of work to do, and though it was sometimes complained that too much work was done in committee, it was utterly impossible that a great deal of the work could be done in any other way. On former occasions it had been very usual for country members to say that they could not attend this Committee, but it would not be necessary for them to attend always if the Council felt it could rely on them when specially summoned.

Mr. Symes protested against any idea that the country members did not work as hard as those living in London. He considered the time spent in travelling was given quite as much to the Society as if he were sitting on a Committee, and he thought it a pity that the list should be published annually stating the attendances of members on Committees.

The President said he did not think it was the intention of anyone to raise a question about the relative amount of work done by town and country members. Those who were not on the Council were quite unaware of an immense deal of work which was done which was quite incapable of being reported. A great deal of it was of a routine character, and had necessarily to be done by members resident in London. Neither the reports nor the discussions represented one twentieth part of the work which was done.

The Council then went into committee to consider the arrangement of the different Committees, as the result of which the following arrangements were made.

General Purposes.—The whole Council. To meet at five o'clock on Tuesday evening before the meeting of the Council, excepting in September, and at such other times as may be required.

Finance.—The President (Mr. Carteighe) and Vice-President (Mr. Gostling) and Messrs. Allen, Evans, Hills, Savage, Schacht, Southall and Woolley. To meet on the day preceding the Council, excepting in September, at half-past three o'clock, or as may be required.

Library, Museum, Laboratory and House.—The President (Mr. Carteighe) and Vice-President (Mr. Gostling) and Messrs. Allen, Atkins, Bottle, Cross, Greenish, Hampson, Hills, Robbins, Savage, Schacht and Symes. To meet at twelve o'clock, noon, on the second Wednesday in each month, excepting in August and September, or as may be required.

Benevolent Fund.—The President (Mr. Carteighe) and Vice-President (Mr. Gostling) and Messrs. Atkins, Baildon, Bottle, Cross, Greenish, Newsholme, Radley, Richardson, Robbins and Symes. To meet at half-past three o'clock on the day preceding the Council Meeting, excepting in September, or as required.

Law and Parliamentary.— The President (Mr. Carteighe) and Vice-President (Mr. Gostling) and Messrs. Allen, Atkins, Baildon, Bottle, Cross, Hampson, Hills, Newsholme, Richardson, Robbins, Schacht, Symes and Woolley. To meet as occasion requires.

Evening Meetings.—The Professors, the Editor and the Curator were requested to assist the President (Mr. Carteighe) and Vice-President (Mr. Gostling) in making arrangements for the Society's Evening Meetings in London.

Building Committee.—The President (Mr. Carteighe) and Vice-President (Mr. Gostling) and Messrs. Allen, Bottle, Hampson, Hills and Robbins. To meet as occasion may require.

Reports of Committees.

FINANCE.

The report of Messrs. Allen, Hills and Woolley, acting as the Finance Committee, was presented, recommending certain accounts for payment.

The President moved the adoption of the report.

Mr. Richardson asked if the expense of the Conversazione was included, and if the question had ever been raised whether the Council had a right to spend the money of the Society in this manner.

The President replied that a portion of the expense had been included and that the question as to the legality of the expenditure had been raised. There was no doubt the Council had such power.

Mr. Greenish asked if any dissatisfaction had been expressed this year with regard to the refreshments supplied by the contractor. He happened to have heard on this occasion more dissatisfaction than usual.

The President said no complaints had been received officially.

Mr. Hampson asked how much had been advanced to the building contractor up to the present time.

The Secretary said the amount included in the present report would make £2000.

The motion was then carried unanimously.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants :—

£10 to a member (aged 65) from 1853 to 1886, and subscriber to the Fund from 1865 to 1886. Applicant had been in business for twenty years, but failed, and is without resources. (Devon.)

£5 to the widow (aged 41) of a registered chemist and druggist, having two children dependent upon her. (Kent.)

£5 towards the support of an orphan girl in a training home.

Three other cases had been before the Committee, but were not entertained.

The report and recommendations were received and adopted on the motion of the Vice-President.

The Examinations.

Mr. Symes then moved the following resolution, of which he had given notice :—

> "That whilst this Council entertains a high opinion of the manner in which the members of the Boards of Examiners perform their duties, it would suggest for their consideration the desirability of adopting a regulation to the effect that no candidate be rejected on examination in one subject only."

He said his object was that the candidate should not be rejected in the first subject he was put to on entering the room.

Mr. Schacht said he rose at this early stage before any opinion was expressed on the merits of the question to move that the discussion upon it be taken in committee ; it was a somewhat delicate point, and he thought anything affecting the conduct of the examiners ought to be discussed in committee before it was done in open Council.

Mr. Symes said he should divide the Council on this point.

Mr. Bottle said this motion would lead the Council to tender and very delicate ground, and it was far better that such a matter should be talked about in private before it came before the public.

Mr. Hampson thought it was very irregular for Mr. Schacht to interrupt a gentleman in the middle of his speech. He could not see any disadvantage in publishing the discussion on this motion. It was a question

which had been brought before the annual meeting, and he thought it would be a great mistake to have it discussed privately.

Mr. RICHARDSON agreed with Mr. Hampson. He thought Mr. Symes would not have put the motion on the paper had he thought it was going to be burked by a private discussion. No doubt it had arisen out of the discussion at the annual meeting, but it seemed to be the idea that whenever the examiners were mentioned that they should not be criticized in any way. He protested against that notion. The Council had to appoint the examiners, and he did not see why their work should not be criticized in an open and gentlemanly manner.

Mr. SYMES said he had no idea of criticizing the detailed work of the examiners, or of saying anything offensive to them in any way, or anything which he would not say openly if they were there. Of course he could not be responsible for what other members might say. This motion should certainly either be discussed in open Council or not at all, and he should object to carrying it forward if it was to be a question for the Committee.

Mr. BOTTLE asked if Mr. Symes would kindly point out to the Council what right it had to make such a suggestion, as he asked it to do, to the Board of Examiners?

Mr. WOOLLEY rose to order. The question was whether the Council should go into committee.

Mr. SYMES thought it was competent for any member to bring forward objections to this course.

The PRESIDENT said it was usual to put such a motion without discussion.

Mr. SCHACHT said the only point he wished to urge was the desirability or not of discussing such a question as this in open Council when the other party was not present to express its own views. In his opinion, it was not fair, and that, as a councillor, he should be doing wrong in taking part in such a discussion. He might have opinions on the subject which he should be happy to express at the proper time, and they might be identical with those of Mr. Symes, but he did not think it was proper to discuss such a point at all and to come to any resolution expressing a favourable or unfavourable view on the conduct of the examiners when only one party was present. He did not wish to discourage discussion, but there were times when things should be first entertained in committee and afterwards discussed in Council. Possibly it might be deemed well to refer the matter to a smaller committee, but he did not think, at present, speeches and expressions of opinion should be published on a subject so delicate as this was.

Mr. CROSS said he was at first in favour of as open and free a discussion as possible, but circumstances altered cases. Mr. Symes was not likely to say anything which would do any harm by being published, but he (Mr. Cross) was only a young member, and there were other young members who were perhaps not so well informed of the doings of the examiners, and they might in the course of the discussion say things which might perhaps do more harm than they would like. It was better to err on the side of caution.

Mr. SYMES said he thought Mr. Schacht could hardly have listened to the terms of the motion, which did not seek in any way to coerce the examiners or condemn them, or anything of the kind, but simply to suggest for their consideration the desirability of adopting a certain regulation. That meant that they should consider the suggestion and report to the Council. If they reported that the present usage was perfectly satisfactory the Council would proceed no further. He must protest against this method of going into committee, talking a thing over and arranging what they should say, and then publishing cut and dried speeches. He could not see any advantage in discussing the subject in committee, and then coming and saying it over again publicly. He had no particular wish for publicity, but the question had been made public at the annual meeting, and he regarded it as the duty of the Council to consider any important matter that came up at an annual meeting at the earliest possible opportunity.

Mr. HAMPSON thought going into committee would make it appear to their constituents that there was something more disagreeable in connection with this discussion than was really the case.

Mr. EVANS suggested to Mr. Symes that unless the motion was discussed openly, it was hardly worth while discussing it at all.

Mr. ATKINS said he must take exception to that view. Mr. Symes's idea was that if there were anything which could be improved, to improve it; but the best way to do that with regard to any question, was to carefully talk it over in a friendly way at an early stage in committee. He was not more prone than other men to rush into extreme utterances, but frequently, when speaking extemporaneously, he had said things which he would rather not have said, and sometimes omitted things which he might have said, and he would urge in the most friendly way on those who agreed with Mr. Symes, the desirability, from his point of view, of discussing the matter first in committee. By so doing the Council would be following numerous precedents. Over and over again a similar question had been raised, and at the close of the discussion he had heard it said what a pity it had not been taken in committee.

Mr. WOOLLEY said he came into the room wishing to have the motion publicly discussed; then his mind had been turned in the other direction by the influence of more experienced men than himself; but he had been re-converted by the remark of Mr. Evans. Rather than this subject should be bottled up and allowed to fester and do all manner of mischief he would wish to have it out.

The motion for going into committee was then put and carried by 13 votes to 7.

The Council went into committee accordingly.

The matter having been discussed for about an hour, the Council resumed, and Mr. Symes withdrew his motion.

THE JUBILEE.

The PRESIDENT moved that the Library, Museum and Laboratory Committee be requested to draw up a loyal and dutiful address to the Queen on the completion of the fiftieth year of her reign. He said addresses of this kind were properly presented by all corporate bodies created by Royal Charter, and under Acts of Parliament passed in Her Majesty's reign. Seeing that the Pharmaceutical Society was founded during Her Majesty's reign and its Acts of Parliament had been passed during that reign, and that it had grown up to years of discretion under her rule, it was only fit and appropriate that an address from a large Society like that should be presented in due course.

The motion was seconded by the VICE-PRESIDENT and carried unanimously.

Mr. BOTTLE then moved—

"That with a view to affording to the annuitants on the Benevolent Fund of this Society, and also to those recommended by the Council and unsuccessful at the last election, the means for the full enjoyment of the Jubilee of Her Most Gracious Majesty, it is ordered that the Treasurer be instructed to pay to each of them the sum of £5."

Mr. SCHACHT asked how much this would amount to.

The PRESIDENT said £240. There had just been a special whip for the Benevolent Fund, and though the amount received was not as great as it was ten years ago, still, having regard to all the circumstances, they might congratulate themselves on the result, £1200 having been already received. As the state of the subscription list had been criticized, and a good many condolences had reached him, he might say that he had looked into the receipts and found that although

the sum received at the previous period was larger in amount, still, during the ten years so many handsome sums had been received in donations, that he thought it could not be expected to find such large donations given every time. Having regard to all the circumstances, he thought this would be a very fit way of celebrating the Jubilee.

Mr. ALLEN said he agreed with the motion if the Fund admitted of this extra gratuity being given. which he believed it did. He was perfectly satisfied with the result of the dinner from one point of view, but when he looked at it in another way and recognized that whilst £1200 had been given by a little over 300 persons, the Fund was applicable to the relief of some 13,000, he could not say that the result was satisfactory. Feeling that, and knowing that to a certain extent the President disliked going round with the hat, he had during the last week called on some of his neighbours and without putting the slightest pressure on them had asked them to consider whether this result was satisfactory from the point of view he had just given, and with one single exception of a gentleman whom he had not seen he was successful in every application; in many cases the subscriptions were doubled, and in some substantial donations were given as well, so that he was able to bring down to the office yesterday eight or nine new subscriptions. If this motion were carried it would show the liberal spirit with which the Council administered the Benevolent Fund, which ought to be appreciated by every member of the Society, and he thought it was not too much to ask the Local Secretaries and others who were interested to take the trouble to put the question personally before their friends as it should be done once in ten years. He was satisfied that if that were done, and if the applications were prefaced by the statement that once in ten years it was customary to make a special appeal, they would be quite thankful the Jubilee had occurred.

Mr. RADLEY asked why this proposition was not brought before the Committee on the previous evening.

Mr. BOTTLE said he had it in his mind to do so, but he felt that it was not for the Committee to decide so much as for the Council. He felt that it would commend itself to every member. £1200 had already been received, and he believed more would come in when people saw the liberal spirit in which the Fund was distributed. This would take about £240, and there would be still about £1000 to invest permanently. It was the intention in all parts of the country to do something with reference to the Queen's Jubilee, and as he had not heard of anything in the way of a ball or dinner, he thought the Council would do itself honour in devoting this sum to gladdening the hearts of the poor annuitants on this occasion.

Mr. SYMES supported the motion, and thought Mr. Allen's remarks deserved special consideration. A personal canvass was the only way of efficiently increasing the Fund, and no doubt the hint given by him would be more or less adopted by the Local Secretaries throughout the country. Whilst supporting the motion he hoped that this liberality would not have any prejudicial effect on future applications for casual relief, for whilst they wished to gladden the hearts of these people, they would not desire to do it at the expense of other necessitous persons.

Mr. NEWSHOLME asked if the special list of donations was still open, and, if so, how long it would remain so?

The PRESIDENT said the complete list was being prepared and it was proposed to issue supplementary lists which the editors of the trade journals would be requested to insert. It would be kept open for at least another two months.

Mr. ATKINS supported the proposal, but hoped Mr. Symes's caution would be borne in mind.

Mr. ROBBINS also supported the motion. None of the annuitants, he thought, were likely to see an occasion of this kind again. He was glad the lists would be kept open for another two months, and had no doubt that a good number of subscriptions would come in.

The motion was then put and carried unanimously.

It was also resolved that £50 be placed in the hands of the Secretary for distribution amongst the clerks and servants of the Society on the occasion of the completion of the fiftieth year of the Queen's reign.

In putting the resolution, the PRESIDENT said he was glad to bear testimony to the zeal and ability with which the clerks and servants of that large establishment discharged their duties.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
April	Day . . .	394	26	4	17
	Evening .	161	14	4	9

Circulation of books.	Town.	Country.	Total.	Carriage paid.
April . . .	138	122	260	£1 11 1

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Medical Register, 1887.
Dentists' Register, 1887.
From the GENERAL MEDICAL COUNCIL.

London University Calendar, 1887.
From H.M. GOVERNMENT and the UNIVERSITY.

Royal Institution, Proceedings, No. 80.
— List of Members, etc., 1886.
From the INSTITUTION.

School of Mines, Ballaarat, Annual Report, 1886.
From the SCHOOL.

Pharmaceutical Society of Australasia, Annual Report, 1887. From the SOCIETY.

Bentley (R.), Text-Book of Organic Materia Medica, 1887. From the AUTHOR.

Roberts (F. T.), The Officinal Materia Medica, 2nd ed., 1887. From the AUTHOR.

Holmes (E. M.), Botanical Note Book, 1878. 2 copies. From the AUTHOR.

Fontaine (G.), Des poisons de flèches et d'épreuve en général et de l'inée en particulier, 1887.
From Professor SOUBEIRAN.

The Committee recommended the purchase of the undermentioned works:—

For the Library in London—

Bentley, Organic Materia Medica, 1887.
Southall, Organic Materia Medica, 4th ed., 1887.
Stewart and Gee, Elementary Practical Physics, vol. 2, 1887.
Worthington, Elementary Practical Physics.
Beckurts and Hirsch, Handbuch der praktischen Pharmacy, 1887.
Robins, Technical School and College Buildings.

For the Library in Edinburgh—

Bentley, Organic Materia Medica.
Bentham, British Flora, 5th ed.
Ganot, Physics, latest ed.
Medical Directory, annually.

Museum.

The Curator's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
April	Morning .	517	36	10	21
	Evening .	103	14	1	4

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimens of the bark of *Xanthoxylum Culantrillo*, from Brazil, and of *Gonioma Kamassi*, from Natal.
From the DIRECTOR, Royal Gardens, Kew.

A section of the tree of *Gonosty'us Miquelianus*.
From the DIRECTOR of the Buitenzorg Botanic Gardens, Java.

A specimen of False Chiretta (*Ophelia alata*).
From Mr. W. ELBORNE.

Specimen of the stems of *Strychnos Nux-Vomica* and *S. potatorum*. From Dr. TRIMEN, Ceylon.

Specimen of Strophanthin.
From Messrs. BURROUGHS and WELLCOME.

Specimen of Strophanthin. From Mr. H. HELBING.

Specimens of the following Cuban sponges, "fine dure" or solids, wool, grass, and yellow, and a fine specimen of the Florida Cup sponge.
From Messrs. CRESSWELL BROTHERS.

Specimen of the oil of Trichilia Dregeana, or "Umkuhla oil" from Natal.
From the CURATOR, Botanical Gardens, Natal.

Specimen of the root of a Jaborandi (*Piper sp.*) from Pernambuco.
From Messrs. T. CHRISTY and Co.

Specimen of a bitter bark from the Bahamas.
From Messrs. HALE and SON.

Specimen of Tu-chung bark from Japan.
From Mr. W. E. CROW, Hong Kong.

Specimen of the leaves of *Gymnema sylvestre*.
From Dr. BIDIE, Madras.

Specimen of "Cerise" gum from Alexandria.
From Messrs. LANGTON, EDDEN and CLARK.

Specimens of Hamama, Mucherus, of the roots of *Cybistax scariosa*, of the bark of *Beilschmiedea sp.*, and a number of unidentified Indian and Corean drugs. From Dr. DYMOCK, Bombay.

The following donations to the Museum of the North British Branch of the Society had been reported by the Assistant-Secretary, Mr J. Rutherford Hill :—

A specimen of Palembang Benzoin (1691) recovered from the sea in Table Bay.
From Mr. C. F. HENRY, Edinburgh.

Thirty living plants of *Ge'semium nitidum*.
From Dr. SQUIBB, Brooklyn, New York.

The Curator had further reported that a log of the Fiji sandal wood, presented by the Executive Commissioner of the Fiji Court at the late Exhibition, had through the kindness of Mr. Umney been submitted to distillation, and that the oil proved to be of exceptionally fine quality and large percentage. The Committee directed that a special letter of thanks should be forwarded to Mr. Umney for the trouble that he had taken in the matter.

In response to applications received from the President of the Pharmaceutical Society of South Australia, the Permanent Secretary of the Massachusetts State Pharmaceutical Association, the Leicester Chemists' Association, and Professor Clowes, of Nottingham, for specimens of materia medica, the Curator had been directed to send such specimens as were at his disposal.

The Professors had attended and reported on their respective classes.

Professor Bentley's letter to the Council had been considered, and it was decided to recommend the Council to appoint Professor Bentley Emeritus-Professor of Botany and Materia Medica at a salary of £100 per annum. The Committee had discussed at some length the future arrangements for the teaching of botany and materia medica, and the further consideration of the matter was adjourned.

At a subsequent meeting the last-mentioned subject was further discussed, and it was decided to recommend that in future the chair of botany be separated from that of materia medica, and that the latter be taught by practical demonstrations. It was also recommended that the botany chair have an endowment of £150 per annum, with the class fees, and that the demonstrator be allowed the class fees for materia medica.

The PRESIDENT moved the adoption of the report. With regard to Professor Bentley, the Committee recommended that in consideration of his long services, not only as a lecturer, but in many other ways, he should be appointed Emeritus-Professor of Botany and Materia Medica, and that £100 be allotted as his salary, the meaning being that he would not necessarily be called upon to do any work. Professor Bentley had been associated with the Society as a teacher since 1844, and while the Committee regretted that the state of his health made it necessary for him to retire, it felt that it would be at least an honour to the Society to pay him the compliment of asking him to become an Emeritus-Professor. He might go further, and say that he was sure if the Council, consisting of so many of the Professor's old pupils, had had the power of doing more, it would have been very glad to do it. The way in which Professor Bentley won the hearts of his pupils was well shown in the case of the Committee, where there was but one universal feeling of respect and affection for him. With regard to the future teaching it was thought that it would be better to separate the chair of botany from that of materia medica, as it often happened that very suitable men were available for the purpose of teaching botany, who might not be so well qualified to demonstrate materia medica This subject as now taught for the purpose of the examinations was very much restricted compared to what it was in early days. In the time of Dr. Pereira it was treated very much the same as it had been in the medical schools. Now, as they knew from the observations of the medical press on the new Pharmacy Bill, it was treated in a different way, and was more conveniently taught by demonstration. The pupil wanted to handle the specimen and examine its structure, and did not necessarily require a course of lectures upon it. Having regard to the means at the disposal of the Society, and of the interests of the school, the Committee thought this separation of the two subjects would be the most convenient course.

Mr. GREENISH seconded the motion.

Mr. CROSS said if there was one professor connected with the school to whom he owed a deep debt of gratitude it was Professor Bentley, for he was his first teacher, and his lectures were the only ones he had the pleasure of attending, and a more courteous, painstaking teacher it would be difficult to find. Professor Bentley had a remarkable faculty for making his pupils love their subject, and did not allow them to feel that they had done with it when they left him. Coming from the country, where there were many facilities for pursuing botany, he must say that he often thought of Professor Bentley in his country rambles, and on taking up a specimen was reminded of what he had said about that particular species. It had often struck him what a great influence was often exercised by men who pursued a certain study from pure love of it.

Mr. HILLS said it was only necessary to attend an evening meeting in October to see how very popular Professor Bentley was with the students, and as an old student he should like to add a word in support of what had been already said to show how much he appreciated Professor Bentley's work in the past, and to corroborate what had been said about the earnest desire he had always shown to engrain in his pupils a love for that subject which he had made so entirely his own.

Mr. SCHACHT said his own time of studentship was rather anterior to Professor Bentley's appointment. He was at the school when the duties which he afterwards so efficiently discharged were performed by two very eminent men, Dr. Anthony Todd Thompson and the great Dr. Pereira. Still it was not less desirable that he should say how universally he had heard Professor Bentley praised by those who had been his pupils, and he was quite sure that those praises were well deserved. He was glad, therefore, to approve of that portion of

the report, and he was also glad that the conclusions with regard to the future teaching of botany and materia medica were not yet final. Referring to his own experience he could not forget how nearly the whole of his own botanical knowledge was gained through Dr. Pereira, Professor of Materia Medica, rather than through the Professor of Botany; not that there was any doubt of Dr. A. Thompson being a perfect master of his subject, but Dr. Pereira had an extraordinary faculty of making difficult things seem easy, and of approaching the uninformed mind in such a fashion as to enable it speedily to acquire knowledge. Besides that he for the first time in the teaching of materia medica was able to distinguish between it and therapeutics, and he led the way so splendidly that he (Mr. Schacht) could not help thinking that in that house at least there was still room for a Professorship of Materia Medica. He did not much like the idea of relegating this subject, in that house at all events, which represented pharmacy in its highest aspects, to anything short of full professorial dignity. He hoped the subject, therefore, would be further considered.

Mr. SYMES desired to support all that had been said in praise of Professor Bentley, to whom he owed a great deal. He also supported the separation of materia medica from botany, and took rather a contrary view to Mr. Schacht on the matter. Both subjects had made great advances since the former professors were appointed, and they wanted a professor of botany now who would adopt certain modern views, go in for histology and so forth. On the other hand, if materia medica could be taught at all it was an eminently practical subject, and unless the teacher could put specimens into the student's hand and encourage him to ask questions about them, he would fail in his teaching to a great extent.

The PRESIDENT remarked that Mr. Symes had very well expressed the views of the Committee, but the members of it were not tied to any special plan. All they wanted was for the Council to sanction the principle of separating the two subjects.

Mr. ATKINS said as he had already taken part in two interesting discourses on this question in committee, he did not desire to say any more upon it; but he wished to pay his personal tribute to Professor Bentley. He felt that the Council ought not to allow thirty-eight years of good service to close without a very warm recognition, and though there was always the risk of tautology in these matters he must say he felt very warmly about it. The whole course of Professor Bentley's connection with the Society had reflected credit upon it, especially by his large influence with medical men; his writings had been accepted as text books, and this again had reflected credit on the School of Pharmacy.

The PRESIDENT said the broad question involved in the acceptance of the report was that there should be a separation in the teaching of these two subjects—that one man should not necessarily teach both. Chemistry and botany had each pushed into the domain of materia medica since Pereira's time, when, in fact, materia medica was very much what you liked to make it. On the whole, the Committee thought that demonstrations would be better for the students than a set of lectures; but there was nothing to prevent making the demonstrator a lecturer or even a professor if thought desirable. He would promise Mr. Schacht that his suggestions should be well considered by the Committee.

Mr. EVANS said he supposed if the subjects were divided the fees would also undergo revision.

The PRESIDENT said, Yes; they would be rearranged after consultation with the professor and demonstrator.

The motion was then put and carried unanimously.

BENEVOLENT FUND DINNER.

The report of this Committee stating what detailed arrangements in connection with the Dinner had been made was received.

THE EXAMINATIONS IN SCOTLAND.

The following report from Sir Douglas Maclagan was ordered to be entered on the minutes :—

Report on the Pharmaceutical Examinations at Edinburgh.

BY SIR DOUGLAS MACLAGAN.

(*April*, 1883, *to January*, 1886, *inclusive.*)

"I regret that I have been unable till now to make my report on the pharmaceutical examinations, which was delayed much beyond the time when it ought to have been rendered, by a long period of personal suffering coming upon me along with domestic bereavement.

"My present report, as on the two preceding occasions, embraces a period of three years, namely, from April, 1883, till January, 1886, inclusive.

"Before making any observations in detail on the results of the examinations, I have to make the general statement of my satisfactfon with the manner in which the examiners have discharged their duties.

"There have again been some changes in the *personnel* of the Board, but there has been no change in the quality of the examinations, and I can only repeat what I have formerly had reason to say, that the decisions of the examiners appear to me to be justly apportioned to the quality of the answers given, and that a due regard is held alike to the welfare of the public and the interests of the candidates. I believe that those who pass the Minor examinations are duly entitled to obtain the certificates, and qualified to undertake the duties of chemists and druggists.

"Of the three classes of candidates whe have come up for examination, I need refer only to the Majors and the Minors.

"The Modified examination candidates are now practically an extinct species, only one candidate having appeared in each of the three years to which this report refers; two of these passed and one failed.

"The results of the examination of the two other classes are shown by the following table :—

Class.	Candidates.	Passed.	Failed.	Per cent. of failures.
Majors.....	25	10	15	60
Minors.....	522	234	287	54·1

In the previous triennium the numbers were:—

Class.	Candidates.	Passed.	Failed.	Per cent. of failures.
Majors.....	29	15	14	48·2
Minors.....	292	166	126	43·15

"It will be seen from a glance at these figures that I am called upon, much to my regret, to repeat what I had occasion formerly to say, that so far from the number of ill-prepared candidates diminishing, it is actually increasing, which circumstance manifests a deplorable ignorance on the part of candidates, and of the persons who are responsible for their training, of what is to be expected from those who desire to obtain a pharmaceutical qualification, and of the means of qualifying themselves for it.

"I had hoped that remarks which have been made not only in my reports but elsewhere would have enabled me considerably to depart from the line of observation made by me in my last report, and to take a more hopeful tone as to the progress of pharmaceutical education in Great Britain, but the facts are against me. I can do little else than repeat what I said formerly, and express my belief that pharmaceutical education is on a wrong basis altogether, and that some radical change is called for.

"Three years ago I expressed my concurrence in the views of those who desire to see a regular curriculum established for students of pharmacy, and from that opinion I do not resile.

"I am led to understand that the position of the Pharmaceutical Society, as defined by the existing law, prevents the adoption of a curriculum. If this be the case, all I can say is, that however difficult to obtain,

some legislation to amend this state of matters is decidedly called for.

"It may be said that if the North British Branch of the Pharmaceutical Society has been able, during the last three years, to send out 234 men with certificates in their hands, all of whom may, so far as public safety is concerned, be entrusted with the responsible duties of chemists and druggists, the wants of the country are fully supplied, and that we may rest content with things as they are. This would be all very well if the protection of the public from unqualified druggists were all that is to be sought for from pharmaceutical examinations, but there is another and at least equally important object to be kept in view, namely, the raising of the character of the pharmaceutical profession generally throughout the country.

"When I gave evidence before Jacob Bell's Committee of Parliament in reference to pharmaceutical legislation, that which bulked most largely in my view was the elevation of the character of British pharmacy, and the bringing it up to some such level as that which it had attained in continental countries. My experience as a student and practitioner of my own profession, and still more as a lecturer for many years on materia medica, had shown me that there were plenty of excellent pharmaceutical chemists in Britain, as there are at this day, but I held that continental pharmacy was ahead of British pharmacy to an extent it ought not to be, and I continue to hold that opinion.

"I shall, I daresay, be accused of harping on one string, but I believe that the string gives the true keynote to what ought to be heard on the subject of pharmaceutical education. If the character and status of the pharmaceutical profession can be raised by bringing into its ranks a larger number of men of higher scientific attainments, of whom no doubt not a few exist among us, the public requirements will be all the more fully and safely met, and the interests of the Pharmaceutical Society of Great Britain advanced.

"I have to make some observations on the special subjects of failure on the part of candidates, under the two heads of Majors and Minors.

"*Majors.*

"The following table shows the percentage proportion of subjects in which the 15 unsuccessful candidates failed :—

Subject.	Per cent. of failures.
Botany	13·3
Materia materia	13·3
Practical chemical working	60·
Failure to obtain pass numbers	13·3

"*Botany.*—This truly scientific subject is one on which many candidates for the Major qualification make very indifferent appearances, though now and then a candidate appears who has thoroughly studied botany and knows it. I hear many candidates describe botanical structures very fairly, but I have no assurance that they know them, if I may so say, personally, so as to be able to apply their botanical knowledge practically.

"I must here refer to a subject on which I have already freely expressed my opinion, namely, the absence from this examination of the microscope. I cannot understand why no demand should be made on candidates, at all events for the Major qualification, to show that they know the use of an instrument which is essential to any investigation of botanical structure ; without which no cultivator of natural science can move a step ; which is appealed to in almost every number of the *Pharmaceutical Journal* ; and which in not a few instances is mentioned as a means of determining the quality of drugs in the British Pharmacopœia.

"*Materia Medica.*—The Major examination in this department is satisfactory, demanding a much larger amount of pharmaceutical knowledge than is to be expected from the Minors. This subject does not call for further remark.

"*Practical Working.*—I have as usual to point out that the large proportion of failures in this subject is due to the fact that candidates come up for 'Practical Working' a day before the oral examinations, and if they fail in the practical work they proceed no further. The substances selected for analysis are in general exceedingly suitable for the purpose, but I have had occasion to remark that when these substances or mixtures have been more of the pharmaceutical than of the merely chemical type, the failures are more frequent.

"I infer from this that there is a neglect, or perhaps rather want of opportunity for candidates extending their knowledge of pharmaceutical chemistry after they have finished their more elementary chemical instruction. The candidates are frequently set to perform analysis by volumetric processes, which is very important, but if it were not for considerations of expense I could wish that the time for practical working extended over more than one day, so that there might be better opportunity for candidates working by the gravimetric method, and showing their familiarity with the use of the balance.

"As the general result of the Major examination, I repeat my desire that it were raised in character, but as matters now stand, I am of opinion that the decisions are equitable, and that those who do pass—only 40 per cent.—are fairly entitled to bear the higher denomination of pharmaceutical chemists. I would be glad, however, to see it become the expression of a higher stamp of attainment than at present.

"*Minors.*

"I refer to what I have said above as to the great and increasing proportion of failures in the examinations. These remarks apply specially to the Minors.

"There is one point to which I wish to call attention as worthy of consideration.

"The rule is that no candidate can reappear for examination till three months after his remission, but there seems to be no power on the part of the Examining Board to refer the candidate to his studies for a longer period. It seems to me to be a waste of the time of examiners, and an encouragement to remitted candidates to take a perfunctory view of what they require in the way of study, to allow men who are absolutely ignorant to come up again before six months at least. There is little hope that three months' study, even if devoted to the one subject, would make much of a botanist of a man who did not know the stamens on the male catkin of a willow, and who thought that the pollen of a plant became its seed ; or anything but a very indifferent chemist of one who could not explain why such and such a quantity of a base was required to saturate such and such an amount of an acid, who in fact seemed never to have learned so rudimentary a chemical doctrine as that substances combine in definite proportions. I am not in the least degree afraid that by a little more severity in the way of the length of the period of remission candidates would be so deterred as to diminish the supply of chemists and druggists required for the wants of the country.

"On the details of the Minor examinations I need not say much, as I have little else to do than to repeat the remarks made in former reports.

"The following table exhibits the percentage of the special subjects in which failures took place during the triennium now under consideration, as contrasted with the two previous triennia.

Subject.	1877-80	1880-83	1883-1886
Botany	32·12	20·80	16·30
Chemistry	23·08	17·44	14·90
Materia medica	6·41	6·71	5·90
Prescription reading	1·92	5·38	3·10
Dispensing	15·38	12·08	16·30
Pharmacy	23·08	12·08	4·50

"It will be seen that these numbers present some satisfactory features. I am disposed to draw from the facts all the good augury I can, for instance from the circumstance that the rejections in botany and chemistry have decreased, and I would wish to derive the hope that we are at the beginning of a period of greater attention to these important scientific branches. All this, however, does not enable me to depart from what I have expressed above as to the general deficiency in the education of candidates at present existing. These actual numbers of failures in individual subjects are liable to great variation from a variety of causes, but I need not say that if these improvements were continued through another triennium it would give substantial promise of better things. The inefficiency of the present state of pharmaceutical education must be judged of by the general result, which points not so much to failure in special subjects as to general deficiency all round, on account of which candidates do not come up to the pass number of marks (600). That the number is increasing not diminishing in the case of the Minors is evidenced by the following comparison of the last three triennia:—

Years.	1877-80	1880-83	1883-86	Years.
Per cent.....	37·8	43·15	54·1	per cent.

"There is one special subject on which I desire to make a remark. This is dispensing, in which—the most practical of all and that which has the most direct bearing on the welfare of the community—the failures are exactly as numerous as in the purely scientific province of botany. I have had occasion to direct attention to this before, and have appealed to the consciences of those who have young men under them as apprentices, but no general satisfactory result has followed. I am myself persuaded that in a large majority of instances the time spent in apprenticeship is time lost. Of course, I know that there are many exceptions to this, and that there are establishments, an apprenticeship in which is (if we put out of view botany and pure chemistry) a complete pharmaceutical education. In the more numerous instances, however, I think a young man would be more usefully employed in attending lectures and reading books, than in standing behind a counter, and retailing drugs, with few opportunities of really learning how to dispense, and no opportunities of practising the making of the galenical preparations of the Pharmacopœia.

"There are two circumstances which appear to me to have an evil influence in lessening the opportunities of the student of pharmacy for learning practical dispensing. The first of these is the system of medical practitioners dispensing their own medicines. In Scotland we have comparatively little of this, except, of course, in rural districts and among an inferior class of practitioners in some of the larger towns, who are to be regarded rather as druggists possessing a medical qualification than as medical men dispensing their own medicines. This is not the place to discuss the merits of the above practice, except in so far as it has a bearing on the student of pharmacy, and I can hardly see how the fact of medical men sending out medicines to their own patients instead of writing a prescription and sending it to the pharmaceutist to dispense. can fail to lessen the opportunity of the apprentice of the latter to learn practical dispensing.

"Of course he may, though not in possession of a pharmaceutical diploma, act as a dispenser, but is it possible for him to have, in the surgery of a busy practitioner, that supervision and guidance which will enable him really to dispense *cito, tuto et jucunde*?

"The other circumstance which appears to me to be inimical to the interests of him who wants to learn practical dispensing is the system of proprietary preparations of recognized medical substances, which seems to be attaining to large proportions, if one may judge from the gigantic system of advertising now in vogue. Of course both the parties to whom I allude are strictly within their rights. The medical man may if he chooses the functions of the pharmacist to those of the practitioner, and the druggist remembering that pharmacy is both a trade and a profession may take the former view of it in preference to the latter, and carry on his trade by the aid of advertising his goods, with the help of commercial travellers and the free distribution of samples. But if this practice is to become general, and if the public are to prefer to the physician's prescription dispensed by the duly qualified pharmaceutical chemist, the proprietary preparation for whose qualities they have only the assurance of the advertiser, it follows that the chemist's apprentice must be shorn of much of his opportunity for learning the practical art of dispensing.

"If any relief in these respects is to accrue to the pharmaceutical profession it must come from the side of the profession of medicine.

"I have thought it my duty, as acting on behalf of the Privy Council, to point to some suggestions for the amelioration of pharmaceutical education. The fact that for several years no improvement has taken place in the average qualification of candidates seems to me sufficient warrant for a demand for such improvement. The most important of these suggestions, that which has given and will give rise to much discussion, is the having a more systematic method of instruction, whether that shall take the form of a regular curriculum or not.

"I care little for a hard and fast curriculum, provided that some security is had that, at least in the scientific departments such as botany and chemistry, it shall be secured that each candidate has had methodical instruction.

"The second suggestion to which I would point is that the Major examination should be raised in character, and that as an instalment towards this end candidates should be made to show that they can recognize plant structures and medicinal substances under the microscope, and that they should have more time for practical work in the laboratory.

"As regards the Minor examination I do not ask for more stringency. The examinations are perfectly good in this respect, but I would wish to see, as the result of a better education, that a higher style of questioning would be not merely not too severe, but would be within the compass of all candidates who desire to give proof of having really been students of pharmaceutical science. Lastly I would draw attention as above to the suggestions as to giving examiners some discretion as to remitting for a longer period to their studies candidates who come up altogether unprepared.

"I do not expect that all or any of these suggestions will be speedily adopted, but I throw them out as at least deserving of consideration.

(Signed) "Douglas Maclagan.

"*Edinburgh, November* 24, 1886."

The Address to the Students.

It was resolved that the Library Committee be authorized to make the necessary arrrangements for the delivery of the Sessional Address to the students in October next.

Dover Chemists' Association.

A memorial from the Dover Chemists' Association with reference to some of the regulations of the Inland Revenue Department was referred to the General Purposes Committee.

The New Building.

The Council went into committee to receive the report of the Building Committee, which on resuming was adopted unanimously.

Chemists and Druggists' Trade Association of Great Britain.

A special meeting of the Executive Committee was held on May 25, at 23, Burlington Chambers, New Street, Birmingham, to consider the position of the Association.

Mr. W. G. Cross (Shrewsbury), President, in the chair.

Present—Messrs. Andrews (London), Arblaster (Birmingham), Barclay (Birmingham), Bell (Hull), Chapman (Scarborough), Churchill (Birmingham), Harrison (Sunderland), Holdsworth (Birmingham), O. Jones (Llanrwst), W. Jones (Birmingham), Laird (Edinburgh), Mackenzie (Edinburgh), Parker (Nottingham), Symes (Liverpool), Walker (London), and the Solicitor of the Association.

Communications were read from Messrs. Maltby (Lincoln), Crook (Eastbourne), Hampson (London), Jervis (Sheffield) and Paterson (Aberdeen), regretting their inability to attend.

The minutes of the previous meeting of the Committee were read and confirmed.

The following report was then read:—

Report of the Finance Committee.

Your Finance Committee met on April 18 last, when the Secretary's cash statement and all books of account were examined and passed for audit, and several accounts were examined and ordered to be paid. The financial statement, duly audited by the official auditors of the Association, showing a balance of £302 15*s.* 10*d.* to the credit of the Association, appears as an exhibit to this report, but from this amount will have to be deducted some outstanding accounts and the current expenses of the Association.

Receipts.	£ s. d.	£ s. d.
Balance brought forward from last Account, viz.:		
Balance at Lloyds, Barnetts and Bosanquets Bank, Limited	305 0 11	
Ditto in hands of Treasurer	8 3 9	
	313 4 8	
Deduct—Law costs unpaid	19 12 2	
		293 12 6
2216 Subscriptions at 5*s.* each		554 0 0
Donations		469 1 0
		£1316 13 6

Payments.	£ s. d.	£ s. d.
Advertisements		10 11 6
Auditors' Charges		12 12 0
Canvassing Expenses		3 18 2
Hire of Room for Public Meetings		3 15 0
Law Costs, viz.:—		
Solicitor's Charges	213 11 5	
Ditto Travelling Expenses	11 10 4	
Witnesses' Charges and Expenses	45 18 9	
		271 0 6
Office Expenses, viz.:—		
Cleaning	1 3 6	
Gas	4 16 6	
Rates and Taxes	2 11 4	
Rent	25 2 8	
		33 14 0
Postages		104 8 1
Reporting		46 10 6
Salaries, viz.:—		
Secretary	200 0 0	
Assistant Secretary	91 0 0	
Clerk	22 9 0	
		313 9 0
Stationery and Printing		69 12 3
Sundries		17 0 9
Travelling Expenses, viz.:—		
Executive Committee	92 1 5	
Secretary	30 6 6	
Assistant Secretary	4 18 6	
		127 5 11
Balance carried forward to next Account, viz.:—		
Balance at Lloyds, Barnetts and Bosanquets Bank, Limited	286 15 4	
Ditto in hands of Treasurer	16 0 6	
		302 15 10
		£1316 13 6

It was moved by Mr. Barclay, seconded by Mr. Chapman, and unanimously resolved:—

"That the Report of the Finance Committee be received, adopted, and entered on the minutes."

The following Report was then read:—

Report of the Urgency Committee.

Your Committee presented a printed interim report to the Exeeutive on the 18th ult. as an annex to the Secretary's circular of the 21st ult., since which date your Committee have held two meetings.

At the first of these, which took place on the 29th ult., your Committee carefully considered the replies received from the Executive to the above-named circular and the proposed circular to the trade was unanimously passed subject to the insertion of dates, two verbal alterations, and one transposition of a sentence. The following resolutions were also unanimously passed:—"That the Secretary be instructed to issue the special circular as now amended to the wholesale and retail trade." "That the Executive, having approved of the recommendation of this Committee that the Secretary be refunded the expenses consequent upon the issue of his special circular to the trade in January last, the Treasurer be requested to hand to the Secretary the sum of £39 1*s.* 2*d.* for that purpose."

At the second meeting of your Committee, held on the 20th inst., your Committee considered the replies received from the trade to the circular issued by the officers of the Association on the 6th inst., when the following resolution was unanimously passed, and the Secretary instructed to convene a meeting of the Executive for Wednesday, the 25th inst., to consider the position of the Association:—"That it having been reported by the Secretary that 1,348 replies have been received in response to the circular issued to the wholesale and retail trade by the officers of the Association on the 6th inst., this Committee is of opinion that the effective working of the Association requires at least 2000 subscribing members of half-a-guinea each. They, however, feel that if the trade were thoroughly canvassed that number might be obtained."

The President proposed that the report of the Urgency Committee be received. He apologized for the short notice of that meeting which the members of the Executive had received, remarking that the Urgency Committee thought that the sooner they consulted the Executive the better. When they last met they passed a resolution to the effect that Mr. Haydon should make a canvass of the members of the trade to get money to meet their liabilities, and to carry them on to the end of the financial year. A more unsatisfactory state of things could scarcely have existed. Mr. Haydon, he thought, very loyally took upon himself to disobey their instructions, and issued circulars both to the wholesale and retail members of the trade.

The Secretary: Not disobey.

The President: Well, to interpret in his own manner our instructions.

The Secretary: That is better.

The President, continuing, said the Secretary issued two circulars, the result of which was that sufficient money was subscribed to put them in a sound financial position for the present year. But after that there remained the very important question as to how they were to proceed. It would be remembered that at the last meeting they passed a resolution that in future the annual subscription to the Association should be half-a-guinea instead of 5*s.*, an alteration which was wise and proper. He had had the pleasure of attending two or three meetings with the view to laying before the Executive some scheme of re-organization, and having agreed upon that scheme, and having got the approval of the Executive, they proceeded to tackle the situation to the best of their ability. He believed they all thought that rather than have an association that could not speak out its mind and was weakly they had better have no associa-

tion at all. If the trade would not support the Association it was no use their endeavouring to go on. If the trade allowed the Association to fall through, upon the trade the responsibility would lie. He contended that every member of the Association had had his full money's worth, and as a proof of that assertion he had it from the Secretary's notes that each member who subscribed 5*s.* cost the Society 7*s.* 8*d.*, the balance being made up by donations. The question now came before them, Having obtained sufficient money to pay their way up to the end of the financial year, how were they going to proceed in the future? They had issued circulars to the trade the result of which was before them. Between 1350 and 1360 replies had been received to those circulars, some of them being the result of a personal canvass, and after the second circular was sent to the Local Secretaries, signed by himself, asking them to make extra efforts. He thought they might take it as a basis of agreement that unless 2000 subscribing members joined—that was unless their income was £1000 a year—it was not possible to satisfactorily carry on the work of the Association. He was there to hear the remarks of the Executive, and any ideas he had on the subject would be fully expressed in the course of the discussion. He thought, however, they might take it as a basis of operations, that unless they had at least 1000 guineas a year to carry on the work they could not possibly do it. That Association, so long as it was an association, must neither degenerate into a mere assurance society nor into a better class of trade's union. They must pursue their work with the dignity that belonged to an association of that character. If they agreed with him to the extent they had gone, he thought they would be of his opinion that the resolution passed by the Urgency Committee was worthy of the support of the Executive.

In reply to Mr. Arblaster, the President said he had received several replies to his circular, and with the exception of a few they were all satisfactory.

Mr. Glaisyer at some length explained the circumstances under which he and Mr. Haydon had issued the circular announcing the possible formation of a Chemists' Defence Agency, stating that there was no idea of interfering with the future of the Association. He was of opinion that the answers to the circular were not sufficient to warrant the Executive in continuing the work of re-construction. If, however, the Committee thought otherwise, so far from there being any contest between Mr. Haydon and himself on the one part, and the Association on the other part, they would abandon their project entirely and give loyal support to the Committee in endeavouring to make their scheme a success.

In reply to a question the Secretary gave the following statistics showing the number of promises of support that had been received in response to the officers' circular, as far as they had been dissected :—

	Number of promises received.	Number of chemists on Kelly's Directory.
London	209	1200
Birmingham	63	182
Hull	13	82
Leeds	16	97
Liverpool	31	231
Manchester	41	235
Nottingham	19	90
Sunderland	12	41
Sheffield	7	103
Scotland	31	780

With regard to the sixty-three promises from Birmingham, he might say before that town was partly canvassed there were only twenty-six promises.

Mr. Holdsworth: Which is the same proportion as the other towns.

The Secretary: Yes.

Mr. Bell spoke of the apathy which characterized chemists in the country towns. They would not take any action unless they thought they would get something out of it.

Mr. Parker said there was an uncomfortable feeling abroad that the Association was going to be wound up. One old member after the receipt of the circular told him that it was a nice thing for him (the speaker) to be soliciting subscriptions for an Association that was bankrupt and insolvent.

Mr. Symes said the impression he had formed with regard to Liverpool was that a canvass would bring a large number of members. He was rather inclined to endorse Mr. Parker's statement as to the lugubrious feeling which had gone abroad. The tone of the circular sent out by the Secretary when he was instructed to make a personal canvass showed that the Association was in a bad way. He did not mean to make a sweeping condemnation of that circular, but he thought it was a little premature. That, and the subsequent circular urging the necessity of an increased subscription had gone to create the impression that the Association was really a thing of the past. Under these circumstances the replies had been very largely discounted. He was sanguine for the future of the Association. He was willing to join in the consideration of any scheme that might be put forward. If the society died there would be a great difficulty in commencing it again. They had now all the machinery in working order, and it was easier to keep it going than to re-start such an organization. At the same time he was not very sanguine of getting voluntary subscriptions every year to the extent which would justify them in continuing.

The Secretary said the remarks of the last speaker would, he feared, leave an impression on their minds that his (the Secretary's) circular of January last had been the first means of conveying to the trade the fact that the financial condition of the Association was unsatisfactory. He thought that was a sweeping condemnation of the circular, and a condemnation that it did not merit. He then read from the report of the proceedings of the Executive at their previous meeting, as published in the trade journals prior to the issue of the circular to which Mr. Symes had referred, extracts from speeches of members of the Executive, showing that the Association was at the time of that meeting (January 14 last) unable to meet its liabilities. At the same meeting the Executive passed a resolution authorizing him to visit London and other towns to endeavour to raise money to get them out of their difficulties. He visited London. He canvassed the wholesale houses, and by that means raised about £80. The time at his disposal did not allow him to visit the provincial towns, and he had distinctly told the Executive that he could not undertake such a personal canvass. He sent out a circular in his own name and on his own responsibility. That circular, whatever might have been its demerits, at all events relieved them of their financial difficulties, and they were now in a position to wind up their affairs if they desired to do so with a perfectly clear sheet. Their position now was infinitely better than it was in January last. At that time they had collected subscriptions from the trade for a twelve months' work. Five months of that was unexpired, and they were unable to meet their engagements. At present they could carry on the work and pay their way until June 30 next, the termination of the financial year. He did not think it could fairly be argued that the Association had been injuriously affected by the issue of his circular in January last. As far as he was personally concerned he certainly should not feel disposed to run an agency against the present Executive of the Association. If they decided to carry on the Association he was prepared, should they desire to retain his services, to act as loyally in their interest in the future as he had done in the past.

Mr. Symes expressed the opinion that the wholesale branch of the trade should not have been appealed to.

Mr. Barclay said, that if the Secretary had not canvassed the wholesale trade for subscriptions he would most certainly have been told that he ought to have done so.

Mr. Andrews asked if, in the event of the Association continuing, it would be possible to reduce the expenses.

The President said they would be able to make but very slight reduction, no matter how economical they were.

Mr. Andrews firmly believed that a material increase in the subscriptions might be effected by means of a personal canvass.

Mr. Harrison said he had not much faith in a canvass. The circulars issued placed the affairs of the Association as fairly before the members of the trade as possible. What had been the result? One thousand three hundred odd people had responded. He took it that these represented the number of people who felt there was any necessity for an Association at all. If they went beyond that and canvassed they simply pressed people into the Society. Bearing this in mind, what probability was there that they would renew their subscriptions? The concluding paragraph of the last circular issued by the officers of the Association was as follows:—"In conclusion, we have to add that should the response to this circular show that there is a sufficiently general and wide-spread desire on the part of the trade that the Association should continue to exist, the Executive will endeavour to so re-organize the Association as to carry on the work on the lines above indicated, subject to the confirmation of the members. If, however, the response does not warrant such a conclusion, they will immediately convene a special general meeting of the members for the purpose of winding up the Association."

Mr. Owen Jones (Llanrwst) said he must candidly confess that if a personal canvass were made of the principality it would rouse the people up. The Welsh people wanted rousing. Many of his fellow tradesmen in Wales had expressed regret at the probability of the Association going out of existence. He considered that a canvass would raise the promises from 1300 to 2000.

Mr. Holdsworth reminded the Executive that 2000 promises did not mean a subscription of 1000 guineas a year. He was certain they would find a great many of those gentlemen who had promised slow in coming forward. Men would make promises under pressure which they would not fulfil.

Mr. Symes said that if men doubled their subscriptions they would expect a more liberal expenditure on their behalf. As it was, if a man was attacked, the Urgency Committee had been careful in guarding the purse, and if it was a doubtful case they had declined to defend. If a man doubled his subscription, he would expect more from the Association.

Mr. Walker said Mr. Symes had stated the case as it appeared to him. The state of affairs had been placed before the members as plainly as possible in the circulars which had been issued. His opinion was that they should bury the Association as decently as possible.

Mr. Bell felt that the members were making a great mistake in not sustaining the Association in the valuable work it was doing, which it had done in the past, and would do in the future. He agreed that it would be difficult to get men to subscribe in the future who now subscribed under pressure only, and expressed the opinion that with an increased subscription the members would expect that more should be done on their behalf. That was a very important aspect of the case, and one they must not lose sight of. He felt exceeding sorry at the deplorable position of the Association.

In reply to Mr. Mackenzie, the Secretary said that last year 2216 members paid subscriptions of 5*s*. each to the Association.

Mr. Harrison: That is less income than our replies represent.

Mr. Mackenzie said he always thought one of their weak points was, that they had not a rule by which the Association could be a working success. They ought to have had a rule by which they should only have defended those who were, or who had been, members of the Association. He thought it was not too late yet if they should decide to go on to make a rule to defend only those who were members, and only to defend new members who had been three months on the list from a certain date.

The President said the suggestions of Mr. Mackenzie were embodied in the scheme of re-organization. With regard to going back to a 5*s*. subscription, he felt sure they could not do that after what had taken place.

Mr. Holdsworth said it should not go forth, in case the society went down, that it was through defending non-members. Their greatest liabilities were incurred in the cases of members. They had taken up but very few cases of non-members. It might be said, and, doubtless, would be said in case they broke up, that they had got into difficulties through having too wide a sphere of operations.

Mr. Symes said that on some occasions the Association had defended chemists whether members or not, on account of the principle involved.

Mr. Glaisyer said that as a rule the cases of non-members and members had occurred on the same day, and they did not want one to run in the front of the other.

The President pointed out the number of replies that had been sent to the circular, and expressed the opinion that if they were to canvass they might get the required number.

Mr. Symes: Can you work with pressed men?

The President: That is a question to be considered.

Mr. Barclay said they all felt that trade just now was in a very depressed condition, and very well knew that institutions which relied on voluntary subscriptions were suffering acutely. They must not, therefore, take too gloomy a view of the situation. He most thoroughly appreciated and supported Mr. Harrison's remarks in regard to the lethargy of members of the trade. The men who had not subscribed would be the first to cry out when the Association had gone down, but if the Association was dissolved the blame would be theirs. It was curious how people who had the best interests of the Association at heart did not respond to the circular. He suggested for their consideration that they should wait until a canvass had been made, fixing a reasonable limit, and that the Urgency Committee, in case the response was not beyond a certain number, should proceed either to wind up the Association, to elaborate or re-organize the Association somewhat on the lines proposed in the circular which had been sent out.

After some further discussion, Mr. Harrison (Sunderland) moved—

> "That in consequence of the inadequate response to the circular of the Executive Committee of May 6, a special general meeting of the members of the Association be convened at an early date to consider the expediency of winding up the Association."

Mr. Barclay, he said, would note that in the proposition there was a little further reprieve. Circumstances might arise which would stimulate those who had hitherto been apathetic between then and the date fixed for holding the proposed meeting. If they found that gentlemen had made a sufficient and adequate response to their circular, then they might consider that it was not expedient to wind up the Association. It was utterly impossible for them to go on with the material at present at their hands.

Mr. W. Jones (Birmingham) seconded the proposition.

Mr. Owen Jones (Llanrwst) said no doubt the report of that meeting going forth would stimulate a lot of the members of the trade to increased action.

Mr. Parker thought it was useless to send out circulars

They had already been sent out warning and entreating people to send in their subscriptions.

Mr. Symes said he was sorry they had not heard both sides of the question put forward by their Secretary and Solicitor; he further stated that having heard all that had been said that day, he did not think if it were reported it would affect the membership. If they voted for the motion, they would appear to turn their backs upon those who thought that another chance was desirable. If they did not vote for the motion, they would do so against their best convictions that the Association would come to an end.

Mr. Mackenzie (Edinburgh) moved as an amendment—

"That a final circular be issued to all the trade who have not responded to the former one, stating the necessity of an immediate reply, as to whether they will join the Association upon the amended lines, and a 10*s.* 6*d.* subscription, within seven days."

Mr. Jones (Llanrwst) seconded the amendment.

Upon the amendment being put to the meeting six voted for and seven against it, three remaining neutral. The motion was then put and carried by ten votes to three.

After a short discussion it was decided to hold the special general meeting in London, on June 17, at 3 p.m.

Provincial Transactions.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

A meeting of the above Association was held at the Grand Hotel, Colmore Row, Birmingham, on Thursday, evening, May 26. It took the form of a musical and social evening, and Mr. Councillor Barclay occupied the chair. Songs, piano solos, and recitations were given by the members. At the close Mr. Barclay alluded to this meeting as being the last of the session, and hinted at the pleasures of an excursion, and suggested that members should think over the matter and endeavour to promote the carrying out and success of what, in the past few years, had become an enjoyable institution.

Obituary.

Notice has been received of the death of the following:—

On the 24th of May, Mr. Robert Buxton, Chemist and Druggist, Cavendish Street, Barrow-in-Furness. Aged 40 years.

On the 25th of May, Mr. John Mealmather Lyon, Chemist and Druggist, Murraygate, Dundee. Aged 29.

On the 30th of May, Mr. Samuel Maskery, Pharmaceutical Chemist, West Derby, Liverpool. Mr. Maskery was a Member, and one of the Founders of the Pharmaceutical Society.

Correspondence.

A Plea for Apprenticeship.

Sir,—In your report of the annual meeting, the President is represented as speaking of examinations as necessary evils, necessary in the Pharmaceutical Society's case because of the impracticability of a thorough training under the modern system of apprenticeship. He believes, however, that the old method was the better one, and that a real training of some years is preferable to an examination lasting but a few hours, as a means of ascertaining one's capabilities. Then he advocates the proposed "curriculum" as a remedy for the evils of the newer method, and enlarges upon the advantages likely to follow its adoption by the Society.

Now it has occurred to me that, granting the possibility of these benefits ensuing, and that the enforcement of a course of study in chemistry, botany and materia medica may lead to the attainment by students of a more satisfactory knowledge of the subjects, according to Mr. Carteighe's own confession there will yet remain a flaw in the education of pharmacists. This defect may be most clearly disclosed by referring back to the reports of the Government Visitor on the examinations for the past two years. I find that by far the greatest number of failures occurred in practical dispensing, pharmacy coming in a bad second, and chemistry, an admittedly difficult science, taking the third place. This is followed in order by prescription reading, and materia medica and botany bring up the rear. I note, also, a very disproportionate increase in the total number of failures in the first, second, fourth and fifth subjects, and a notable decrease in those in chemistry and botany during last year as compared with the previous one. In other words, assuming the examinations to be moderately fair tests of knowledge, we find men coming up less and less fitted to succeed in the three subjects which undoubtedly ought to be studied practically in the shop, and in the one, materia medica, which in its most important part (recognition, tests of quality, etc.) is also best practised there, whilst the sciences, for the better apprehension of which the "curriculum" is specially designed, are evidently better known than before. This being so, one is inclined to ask "how is the 'curriculum' to effect all the wonderful and desirable results expected by its supporters on its adoption?" Without at all depreciating the value of a more thorough acquaintance with the sciences upon which our art is based, may we not rather anticipate that this knowledge may possibly be gained at the expense of the already neglected practical work, and that exact scientists may prove to be but poor pharmacists. Theory is useless to us except we can apply it in practice, and it seems plain to me that the enforcement of the "curriculum" will but show more clearly where the real difficulty lies, and that it is not pupils and students who require to see the errors of their ways so much as principals. For in spite of Mr. Carteighe's idea that apprentices nowadays cannot expect to be trained as of yore, I maintain that those employing them are morally bound to instruct them in their craft in a much greater degree than they actually do at present. Should it be urged that many have not the facilities for so doing, I reply that such as have not do great wrong in receiving apprentices at all. Wrong to the lads in that they deceive them as to the necessities of the business, wrong to themselves by deadening their moral sense, and wrong to the public in sending forth as assistants men who ought to be practically trained, but are only partially fitted for their work. Whilst the examination, passed after a longer or shorter spell of work in library, laboratory and museum, comes as a crowning mockery which no "curriculum" can dignify.

It would appear then that we must look for the root of the evil in the conduct of those already established in business, rather than blame the raw material of our profession. My own experience of pharmaceutical students, which is confirmed by that of successful teachers, is that they work as hard and as thoroughly as any other class. But their rights have been too much neglected in time past. They may fairly demand to be dealt with honestly, and to be taught that which is essential to their future business existence. Instruct them fully in their art, and I venture to prophecy they will gladly acquire the complementary science.

Some few individuals already act towards their apprentices "as they would be done by," and are to be honoured accordingly. When all or the majority follow suit our standing as a profession will be assured. Until then no outcome of any mere expediency system will serve as a remedy to a deeply-rooted moral disease.

Sheffield. John Humphrey.

Communications, Letters, etc., have been received from Dr. Smith, Messrs. Abraham, Saul, Brownen, Highlander, Senex.

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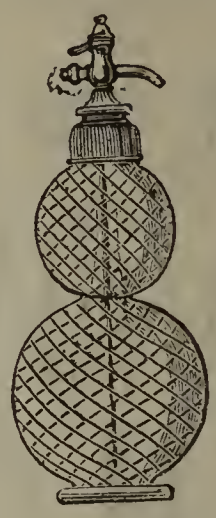

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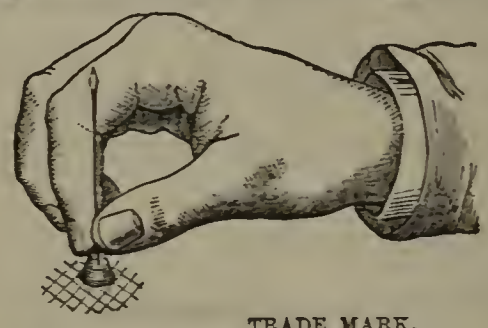

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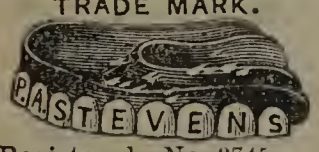

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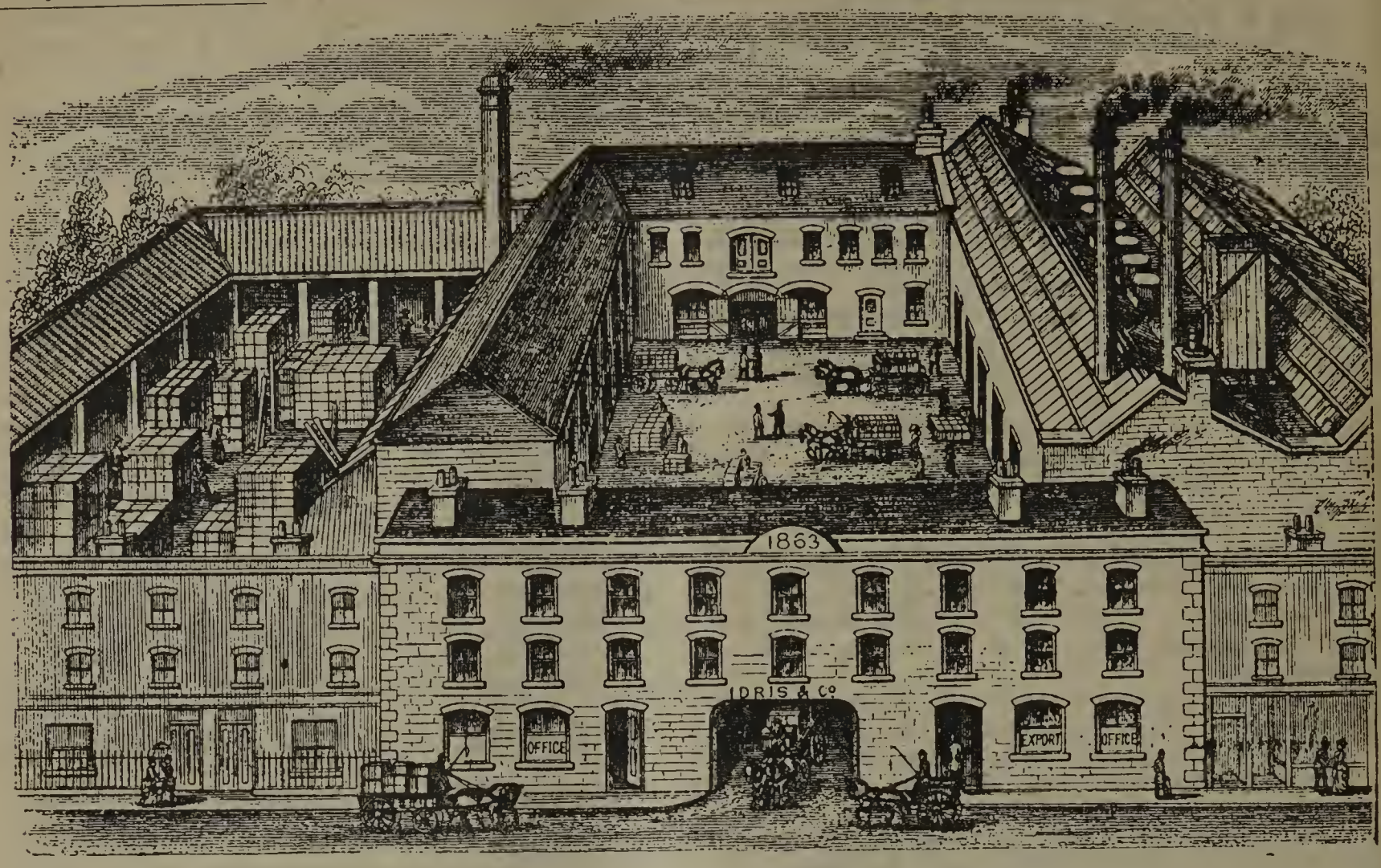

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Agents wanted at home and abroad. **TOOTH POWDER, 3s. per doz. Retail, 1s. each.**

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The only Brand supplied to the War Office.

7 lb. Tins	per lb. 5/11	each	41/5	4 oz. Jars	per lb. 6/7	per doz.	19/9
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Write for Detailed Price List to the Australian Meat Co., 9 and 11, Fenchurch Avenue, E.C. 6 *lbs. Carriage Free.*

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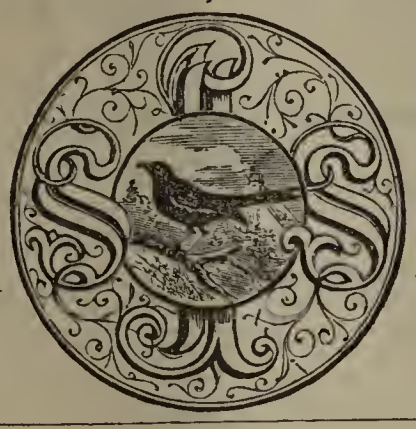

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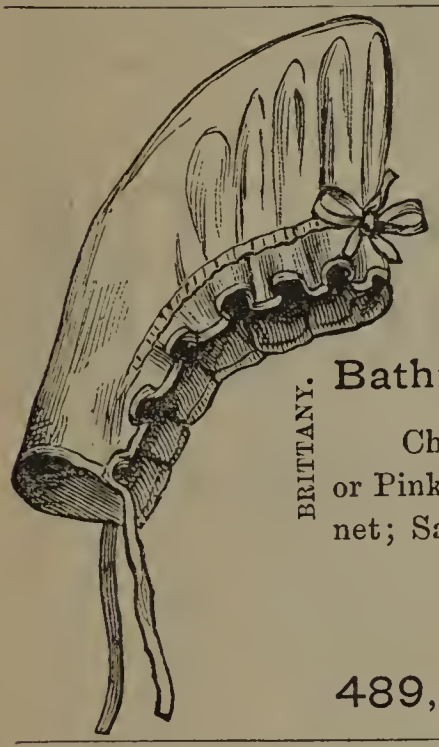

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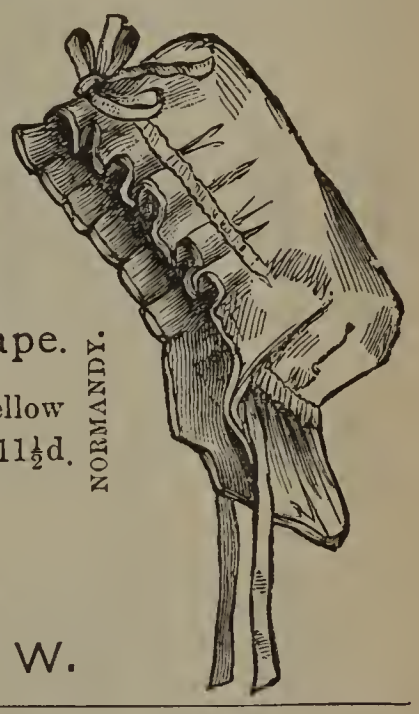

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Bathing Caps, Normandy or Brittany cap shape.

Check Sheeting, per doz. 21s., 18s. net; Jaconet, White, Yellow or Pink, per doz. 21s., 18s. net; Pointille Check, per doz. 28s., 23s. 11½d. net; Sateen Check, per doz. 29s. 6d., 25s. 2½d. net.

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Which is acknowledged on all hands to be the most reliable Preparation for removing Grease, Oil, Tar, Wax or Paint from every description of Wearing Apparel or Household Stuffs. It neither injures the colour or texture, nor leaves any odour or stain. It is neatly got up, and is a most saleable article. Observe the word "COLLAS" on label and cap.

1,000 Handbills, with Name and Address, will be printed for any Chemist who gives an order for £1 WORTH of BENZINE COLLAS at the following prices, viz.:—6d. Size, 4s. per doz., subject to Discount. 1s. Size, 8s. per doz., subject to Discount. 1s. 6d. Size, 13s. 6d. per doz., subject to Discount. SPECIAL QUOTATIONS TO SHIPPERS AND BUYERS OF 6 DOZEN OF ANY SIZE AND UPWARDS.

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Boxes, 1/6 dozen net.

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Is SIMPLY UNEQUALLED and really THE CHEAPEST in the end.

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Digested with marvellous facility by the most delicate invalids and children.
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	White Fittings.			Black Fittings.		
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Export, China or Wood Top Corks ... ,,	3/6	—	—	4/-	—	—
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FOR FURTHER PARTICULARS SEE QUARTERLY PRICE CURRENT, PAGES 46 and 47.

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The Paris Hospitals have used no other.

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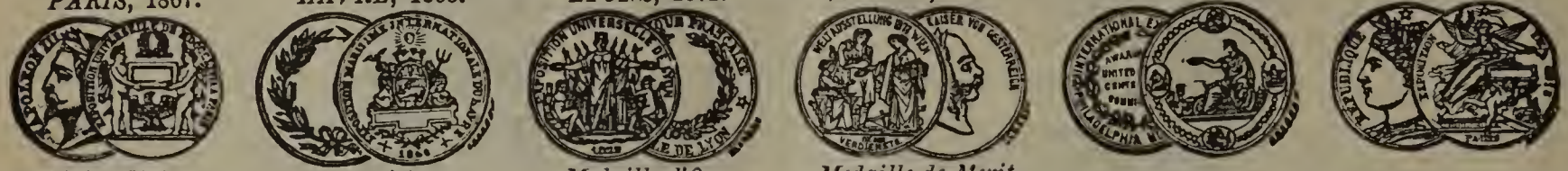

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The Jury of the International Exhibition, Paris, 1867, awarded to BOUDAULT'S Preparations the *only* Medal given for Pepsine. Since that time it has taken the Medal at each of the International Exhibitions—Havre, Lyons, Vienna, Philadelphia, and Paris, 1878.

BOUDAULT'S PEPSINE—dose, 5 to 10 grains—in bottles, one ounce, 5/-; in bottles, half-an-ounce, 3/-
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PEPTONES
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MUTTON,
VEAL,
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CHICKEN.

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(REGISTERED)

A NOURISHING MEAT AND MALT WINE COMPOUND.

A stimulating tonic nutrient. DOSE—¼ to 2 ounces twice daily.
In Bottles, 2s. 6d., 5s., and 7s. 6d.

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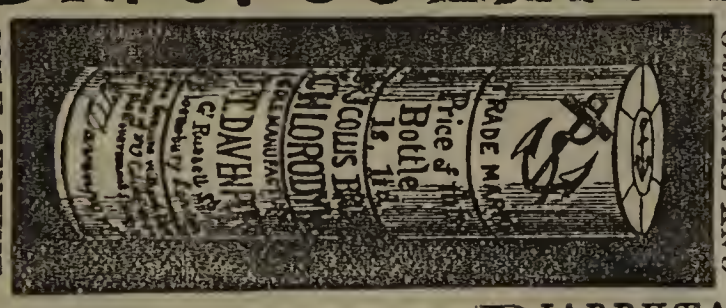
Laboratory—MITCHAM, SURREY.

THE ORIGINAL AND ONLY GENUINE.

DR. J. COLLIS BROWNE'S CHLORODYNE

ONLY GENUINE.  ORIGINAL AND

IS THE GREAT SPECIFIC FOR CHOLERA, DYSENTERY.

COUGHS. COLDS. ASTHMA. BRONCHITIS.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Dr. J. C. BROWNE (late Army Medical Staff) DISCOVERED a REMEDY to denote which he coined the word CHLORODYNE. Dr. Browne is the SOLE INVENTOR, and, as the composition of Chlorodyne cannot possibly be discovered by Analysis (organic substances defying elimination), and since the formula has never been published, it is evident that any statement to the effect that a compound is identical with Dr. Browne's Chlorodyne *must be false.*

This Caution is necessary, as many persons deceive purchasers by false representations.

DR. J. COLLIS BROWNE'S CHLORODYNE.—Vice Chancellor Sir W. PAGE WOOD stated publicly in Court that Dr. J. COLLIS BROWNE was UNDOUBTEDLY the INVENTOR of CHLORODYNE, that the whole story of the defendant Freeman was deliberately untrue, and he regretted to say it had been sworn to.—See *The Times*, July 13th, 1864.

DIARRHŒA, DYSENTERY. GENERAL BOARD of HEALTH, London, REPORT that it ACTS as a CHARM, one dose generally sufficient. DR. GIBBON, Army Medical Staff, Calcutta, states: "2 DOSES COMPLETELY CURED ME of DIARRHŒA."

From SYMES & Co., Pharmaceutical Chemists, Simla. *Jan.* 5, 1880.

To J. T. DAVENPORT, London.

DEAR SIR,—We congratulate you upon the widespread reputation this justly-esteemed medicine has earned for itself all over the East. As a remedy of general utility, we much question whether a better is imported, and we shall be glad to hear of its finding a place in every Anglo-Indian home. The other brands, we are happy to say, are now relegated to the native bazaars, and, judging from their sale, we fancy their sojourn there will be but evanescent. We could multiply instances *ad infinitum* of the extraordinary efficacy of DR. COLLIS BROWNE'S CHLORODYNE in Diarrhœa and Dysentery, Spasms, Cramps, Neuralgia the Vomiting of Pregnancy, and as a general sedative, that have occurred under our personal observation during many years. In Choleraic Diarrhœa, and even in the more terrible forms of Cholera itself, we have witnessed its surprisingly controlling power. We have never used any other form of this medicine than Collis Browne's, from a firm conviction that it is decidedly the best, and also from a sense of duty we owe to the profession and the public, as we are of opinion that the substitution of any other than Collis Browne's is a deliberate breach of faith on the part of the chemist to prescriber and patient alike.—We are, Sir, faithfully yours, SYMES & CO., *Members of the Pharm. Society of Great Britain, His Excellency the Viceroy's Chemists.*

DR. J. COLLIS BROWNE'S CHLORODYNE is the TRUE PALLIATIVE in NEURALGIA, GOUT, CANCER, TOOTHACHE, RHEUMATISM.

DR. J. COLLIS BROWNE'S CHLORODYNE is a liquid medicine which assuages PAIN of EVERY KIND, affords a calm, refreshing sleep WITHOUT HEADACHE, and INVIGORATES the nervous system when exhausted.

DR. J. COLLIS BROWNE'S CHLORODYNE rapidly cuts short all attacks of EPILEPSY, SPASMS, COLIC, PALPITATION, HYSTERIA.

IMPORTANT CAUTION.—The IMMENSE SALE of this REMEDY has given rise to many UNSCRUPULOUS IMITATIONS. Be careful to observe Trade Mark. Of all Chemists. 1s. 1½d., 2s. 9d., and 4s. 6d.

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THE ORIGINAL AND ONLY GENUINE.

IMPORTANT DECISIONS.

Lord Chancellor SELBORNE, Vice-Chancellor Sir W. PAGE WOOD, and the LORDS JUSTICES of APPEAL.

VICE-CHANCELLOR SIR W. PAGE WOOD, by whom the suit in Chancery was first heard, stated, in his judgment, that "Dr. J. Collis Browne was undoubtedly the Inventor of Chlorodyne, that the whole story of the Defendant Freeman was as deliberately untrue as the falsehood he had deposed to with reference to the use of his Chlorodyne in the Hospital."

THE VICE-CHANCELLOR also stated, "that Chlorodyne was a fanciful name, and had application been made sooner, the Court would have given Dr. Browne protection."

LORD CHANCELLOR SELBORNE coincided with the judgment of the Vice-Chancellor upon this point, and stated "that had application been made at a proper time and place, the Court would have found means to restrain the Defendant from misrepresenting the decision of the Vice-Chancellor."

LORD JUSTICE JAMES on appeal stated, in his judgment, "that the Defendant Freeman had made a deliberate misrepresentation of the decision of Vice-Chancellor Wood."

FURTHER IMPORTANT NOTICE.

The subjoined list of eminent Firms concur with Vice-Chancellor Sir W. Page Wood's statement in Court that Dr. Collis Browne was undoubtedly the Inventor of Chlorodyne; and that when Chlorodyne, or the Original Chlorodyne, is ordered, they invariably supply Dr. J. Collis Browne's:—

Apothecaries' Hall	London.	Frazer & Green	Glasgow.	Morson, T., & Son	London.
Allen, Hanbury & Co.	,,	Gale & Co.	London.	Newbery & Sons	,,
Baiss Brothers	,,	Giles & Son	Clifton.	Oldham, G., & Co.	Dublin.
Banks & Richards	Birmingham.	Goulding, Messrs.	Cork.	Parsons & Richardson	Leicester.
Barron, Harveys & Co.	London.	Grattan & Co.	Belfast.	Peake, Allen & Co.	Dublin.
Bell, John & Co.	,,	Grimwade, Ridley	London.	Raimes & Co.	Edinburgh.
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Cox & Gould	,,	Hearon, M'Culloch & Co.	London.	Sanger, J., & Sons	London.
Curling & Co.	,,	Hodgkinson, Tonge & Stead	,,	Sim, James, & Co.	Aberdeen.
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Dobbin, W., & Co., Limited	Belfast.	Hovenden, R., & Sons	,,	Southall & Co.	Birmingham.
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After these public statements in a Court of Equity, and subsequent confirmation by the trade at large, no Chemist can conscientiously use or sell any other compound for Chlorodyne, without committing a breach of faith, unjust to patient and physician. The *value* of the remedy *alone* creates the great demand.

Sold in Bottles—1s. 1½d., 2s. 9d., 4s. 6d., and 11s. Usual Discount to the Profession.

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DR. JOHN FRANCIS CHURCHILL'S INHALANT

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FOR THE TREATMENT AND CURE OF ALL

Diseases of the Lungs, Windpipe, Nose and Throat,

Claims to be a Specific for all Congestive and Inflammatory conditions of the Respiratory Apparatus, and will be found efficacious in

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REGISTERED.

COUGHS & COLDS, ASTHMA, BRONCHITIS,

Inflammation and Congestion of the Lungs, Pneumonia, Pleurisy, Whooping Cough, Croup, Diphtheria, Pharyngitis, Laryngitis, Catarrh, Sore Throat, Quinsy, Enlarged Tonsils, Hoarseness, Loss of Voice, Colds in the Head, Ozœna, Hay Fever and all other Complaints of the Respiratory Organs.

PREPARED ONLY BY THE INVENTOR.

None Genuine except such as bears the Trade Mark and his Signature upon the Bottle, on the Label over the Cork, and on the Wrapper,

JOHN FRANCIS CHURCHILL, M.D. (Paris),

The Discoverer of the Specific Cure for Consumption, and of the Medicinal Properties of the Hypophosphites.

Price 4s. 6d. and 11s. per Bottle. **Set of Apparatus for Administration, 15s.** **Pamphlets free on application.**

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Savaresse's Capsules of membrane each containing 15 drops Pure Maranham Copaiba Balsam, or, also of membrane, each containing 10 drops Purest Yellow Sandal Wood Oil. The efficacy of these valuable medicines is due to the absolute purity of the Balsam or Oil, and to the very gradual solvability of the membrane as compared with gelatine.

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Cubebs, Stramonium, and Cannabis Ind. (soothing). Relief in Asthma, Throat Cough, Bronchitis, Influenza. A specific against Fogs.

BOXES (12) 1*s.*, 9*s.* per doz.; (36) 2*s.* 6*d.*, 24*s.* per doz.

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SPIRITS OF WINE CHEMICALLY PURE

The Best English Grain Spirit, free from Fusel Oil.

ALSO FINEST ORANGE WINE AND SHERRY FOR MEDICINAL PURPOSES.

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Duty free for Exportation—also best Methylated Spirit at lowest prices.

TRADE MARK REGISTERED.

LEECHES! LEECHES!

Warranted Healthy, Wholesale and for Exportation.

Choice quality, Hambro' speckled and Officinal Green. A constant supply always on hand. Delivered free to all parts of London daily.

Special Terms to Wholesale Druggists, Leech Merchants, and Exporters.

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CARLSBAD SALTS.

The new Stock of the above having now arrived from **Mr. LÖBEL SCHOTTLÄNDER, Carlsbad,** full particulars as to the altered shape of bottles, style of labels, &c., will be forwarded on application to the Sole Consignees,

INGRAM & ROYLE,

52, FARRINGDON ST., LONDON, E.C.

AND AT

LIVERPOOL & BRISTOL.

The Prices will remain the same as at present.

28th May, 1887.

Woodhall Spa.

BROMO IODINE MINERAL WATER.

The strongest known Mineral Water in the world. This remarkable Spa has been purchased by a syndicate of gentlemen, who have determined to make more widely known the extraordinary curative powers of this Spring, which contains more Iodine and Bromine than any Spring in Europe. An analysis of the water having been made in November, 1886, by Professor Wanklyn, M.R.C.S., corresponding member of the Royal Bavarian Academy of Sciences, Professor of Chemistry, a very important discovery has been made—viz., the presence of Free or Elementary Iodine.

Dr. WANKLYN says:—"So far as I am aware, his is the first instance in which free iodine has been found in appreciable quantity in a natural water. For many years the Woodhall Spa has been celebrated as a valuable remedy in skin diseases. The fact that it is a solution of free iodine is interesting in this connection, and well worthy of the attention of the medical profession."

The Woodhall Bromo Iodine Water is now being bottled at the Spring by the Sole Agents, BROMLEY & CO., Chemists, 233, High Street, Lincoln, 5 and 6, The Grove, Buxton, and Woodhall. All communications to be addressed to them at the Spa, Woodhall, Horncastle.

DISPENSING BOTTLES & PHIALS

THE BEST BOTTLES AT THE LOWEST PRICES.

Price List and Sample of any kind forwarded Free on application.

I. ISAACS & CO., Glass Bottle Manufacturers,

25, FRANCIS STREET, TOTTENHAM COURT ROAD, LONDON, W.C

Established upwards of 50 years.

STROPHANTHUS.

TINCTURE AND TABLOIDS.

THE NEW HEART TONIC.

Viewed at a distance in its African home, the body of the Strophanthus, spiral in form, resembles that of a huge boa constrictor. Its rod-like branches creep up the nearest trees, and on them are pendent pods containing seeds; these pods grow in pairs, and have the appearance of a huge pair of horns, attached by their juncture to a slender twig.

The seeds of the Strophanthus are the most active part of the plant, indeed the most active poison the natives of Africa possess. It is with a paste made from them that the African besmears his arrows, making it more adhesive with the bark from a species of Lilliaceæ. Our agent in Africa writes: "Game wounded by an arrow thus poisoned dies at once, seldom being able to run over 100 yards."*

After investigating the properties of the drug for many years, Professor Fraser specially called the attention of the profession to Strophanthus at the last meeting but one of the British Medical Association. The Professor pointed out that in difficulties and embarrassments of the circulation depending upon a central cause, Strophanthus acts on the heart alone without increasing the organ's difficulties, by closing the blood-vessels into which it must empty itself, as does digitalis. During the last eighteen months the action of the Strophanthus in cardiac affections has been tested by several of the most careful observers, and the uniformly satisfactory results obtained with it created so great a demand that at one time the supply was inadequate to satisfy it. We are now, however, provided with a goodly supply of seeds and pods of excellent quality, and although the demand for the Strophanthus is more general than ever, and seems greatly on the increase, we believe that the profession will have no further trouble in obtaining as much of the drug as they need.

As the handling of such a powerful poison in liquid form by patients is not free from danger, and as there is liable to be a variation in the dose taken each time, for it may not always be measured with absolute precision, we have prepared the drug in the form of tabloids. Furthermore, as contributing perhaps to the greater security from accident of those who may use the former preparation, we have changed the proportions of our tincture from one in eight (as formerly prepared) to Dr. Fraser's new formula of one in twenty. The dose of the tincture is now from two to ten drops. The Tabloids of Strophanthus as formerly prepared contained two drops of the former tincture, the new tabloids will contain two drops of the new tincture.

As illustrative of the extreme usefulness of Strophanthus we venture to give the following notes culled—but abridged for want of space—from Dr. Fraser's interesting paper, a copy of which we shall be pleased to supply gratis upon request.

CASE I.—Mitral regurgitation with dilatation. There were distressing dyspnœa, œdema of lungs and feet, and enlargement of liver and spleen. Under Strophanthus, there was great improvement in the circulation and renal functions, and a restoration to "comparatively good health."

CASE II.—Mitral stenosis and regurgitation (of three years standing in boy 14), with orthopnœa, œdema, ascites, præcordial tenderness, nausea and diarrhœa. Heart reached from second to sixth intercostal space; transverse diameter, $8\frac{1}{2}$ inches. Patient convalescent in fortnight with Strophanthus.

CASE III—Mitral and tricuspid regurgitation in lad 16, with œdema, anasarca, dyspnœa, nausea, vomiting, cardiac pain and palpitation, and lessened urine. "Patient improved greatly" with Strophanthus.

CASE IV.—Mitral regurgitation following acute rheumatism (in female 33), with great obstruction to circulation, anasarca, a rapid, feeble, almost uncountable pulse, and scanty albuminous urine. Under Strophanthus, pulse and urine became almost normal in a few days.

CASE V.—Mitral regurgitation in female 22, with uncountable wrist pulse, and over 150 heart beats per minute. In 40 minutes after a hypodermic of strophanthin "the patient volunteered the remark that she had not felt so little distress for six weeks."

CASE VI.—Mitral stenosis and regurgitation. Strophanthus soon set the circulation right, removing visceral engorgement and œdema, and producing a copious flow of urine.

In the last two cases trials with digitalis seemed to demonstrate its comparative inferiority.

Small doses of Strophanthus increase the systole and slow the heart's contractions. Compared with digitalis, it exerts a more powerful influence upon the heart and produces fewer secondary actions, affecting less powerfully the blood-vessels. Secondarily, it increases blood tension, produces diuresis, and reduces temperature. It is not cumulative.

Reduced Price of Tincture, $\frac{1}{2}$ oz. bots. 10/- per doz. 1 oz. bots. 15s. per doz. Tabloids, 2/3 per 100. Subject to usual Discount.

* It is said that "the flesh is eaten without any evil effect ensuing; the only precaution taken is to squeeze the sap out of a piece of the bark of the Baobob tree into the wound made by the arrow. The sap of this bark is believed to neutralize any evil effect that may result from the poison being more plentiful in the vicinity of the wound."

BURROUGHS, WELLCOME & CO., Manufacturing Chemists, Snow Hill Buildings, E.C.

NOTE ON CATHA EDULIS.

BY DR. B. H. PAUL.

The use to which the leaves of *Catha edulis* are applied by the Arabs and the accounts that have been given of their stimulating effects naturally suggest the probability that they may resemble, in containing caffeine, the vegetable products that are used for similar purposes, such as coffee or tea, etc., or perhaps have some resemblance to coca leaves. Having been provided with a small quantity of the leaves of this plant, which are known in Arabia by the name of gat or kat, I undertook their examination, specially for the purpose of ascertaining whether they contained caffeine or any analogous substance. The leaves operated upon had been presented to the Pharmaceutical Society by Mr. Redhouse, through the hands of Mr. C. B. Allen, who gave an account of them at the Society's Evening Meeting last February (*ante*, p. 656). The bundle of leaves, as received, corresponded exactly with the drawing given by Daniel Hanbury* to represent the Subbare kat presented to him by Mr. Vaughan, and according to the account given by him it appeared to be the produce of *Catha edulis*.

On digesting the leaves with ether a very dark coloured tincture was obtained, of a deep bluish-green colour by transmitted light when in a thin layer, and in larger masses brownish-red. By evaporating off the ether a very dark green waxy residue was left that was only partially soluble in alcohol. This appeared to consist chiefly of chlorophyll mixed with a waxy substance, and after precipitating the chlorophyll from the alcoholic solution by lime the filtrate gave no indications of the presence of caffeine.

The leaves, after having been treated with ether, were digested for some time with strong alcohol at a moderate heat, and on evaporating the clear tincture about 10 per cent. of a dark coloured aromatic extract was obtained, for the most part soluble in water. The water solution of it contained a considerable proportion of substance which formed a yellow precipitate with acetate of lead, and after that had been separated the clear liquor left on evaporation a brown syrupy residue. Treatment of this residue with chloroform failed to extract from it any caffeine, even after the addition of ammonia.

If the leaves had contained caffeine indications of its presence should have been obtained either in the ethereal or the alcoholic extract, and consequently it may be inferred that the leaves do not contain this substance. So far as I am able to judge from the results of my examination I am disposed to think that the stimulating effects attributed to the leaves when chewed may be due to ethereal oil or some other aromatic and volatile constituent, but to determine this point a larger supply of the leaves would be required. One point to which reference may be made in a general way is the presence of a form of tannic acid in the leaves of *Catha edulis* closely analogous to that met with in tea, coffee, maté and coca leaves. It is indeed possible that the physiological action of these articles of food may be in some measure due to the astringent substances they contain, as well as to the presence of caffeine, theobromine, or cocaine; and from this point of view the further examination of those different analogues of tannic acid may be worth attention.

Analytical Laboratory,
1, *Victoria Street, Westminster.*

* *Pharmaceutical Journal*, [1], xii., 269.

OBSERVATIONS ON SOLAR ACTINISM. ITS CAUSE AND EFFECT.

BY WILLIAM CORDUKES STABLES.

The important chemical changes, both of combination and decomposition, produced by the action of the solar rays on many compounds, both organic and inorganic, are well known to every practical chemist. These changes appear to be caused by a general agitation of the atoms of which the body is composed; and this agitation may possibly be more or less intense according to the degree of chemical affinity existing between the elements concerned. But this is doubtful. Dr. Hermann Vogel says, "Decomposition is effected by light, when the atoms of a body are agitated by its undulations, that is to say, are made to vibrate, and if these vibrations are unequal, a separation of the parts takes place, and the body falls to pieces." He also goes on to say that "Red is the colour which gives the fewest vibrations, it is the lowest tone in colours, and violet is the highest, giving vibrations nearly twice as rapid as red." This theory when carefully considered may be made to explain many of the phenomena of daily life, in the domain of operative chemistry, as well as in nature. The author was induced to devote special attention to the matter through observations and experiments made in the preservation of syrup of iodide of iron. It may not be generally known that this syrup, when it has become brown through the separation of free iodine, may be effectually decolorized by exposure for a few days to a powerful light, that is to say daylight. The bottle, however, containing the syrup should be of white glass, and must be kept quite full, so that atmospheric air is entirely excluded. An experiment made by exposing an aqueous solution of iodine gave evidence of the formation of hydriodic acid. This, however, was anticipated, as bromine is known to behave in a similar manner, thus :—$2Br_2 + 2H_2O = 4HBr + O_2$.

This leads to the inevitable conclusion that though water itself is not decomposed by the action of light, this is certainly the case when in the presence of free haloids. The necessity for the exclusion of atmospheric air is sufficiently obvious. The sun is doubtless a powerful oxidizer, especially in the presence of moisture, therefore a most valuable disinfectant. The question arises, as to whether oceanic ozone is not formed by this means, that is to say, by the action of sunlight on water charged with haloid salts, and containing perceptible quantities of free iodine. Again, common chlorinated lime and other similar disinfectants owe their value to the same cause. They are most effective when in the presence of moisture and light; the water being decomposed by the chlorine, and oxygen liberated. It is quite possible that in direct sunlight traces of ozone may also be formed. There is some evidence to the effect that oxidation may be produced by the solar rays in the absence of any perceptible quantity of water, but this is probably due to the presence of atmospheric moisture. The lower oxides of arsenic and lead are instances of this, also sulphide of lead, which becomes oxidized into sulphate when exposed for some time to the sun. The salts of iron furnish us with some remarkable examples of the influence of actinism. Some ferrous salts are converted into ferric, whilst certain ferric salts are reduced to the ferrous state.

Ferric oxalate is an instance of the latter, and can probably be explained as follows :—

$$2Fe_2(C_2O_4)_3 + 2H_2O = 4(FeC_2O_4) + 2H_2C_2O_4 + O_2.$$

A good instance of the former is furnished by ferrous sulphate, which, especially when in solution, becomes rapidly converted into the ferric state, much to the annoyance of the photographer.

Instances of simple combination induced by actinic rays are less frequent, but some are well known. Chlorine and hydrogen combine with explosive violence when exposed to direct sunlight, but not otherwise. The haloid salts of certain gaseous hydrocarbons can only be prepared in the sunshine; and for the preparation of chloracetic acid the same condition has to be observed.

A very useful list of the more important substances acted upon by light has been published by Mr. J. Vincent Elsden, B.Sc., in a communication to one of the photographic year-books.

These instances of simple combination can be readily explained by the theory of atomic agitation produced by the undulatory vibration of the solar rays; the individual atoms being thereby physically intercommingled, and atomic combination accordingly accelerated.

The absence of light produces some of the most curious results in operative chemistry, as well as in nature. Mr. Vincent Elsden, in his most valuable communication above referred to, says that "ferric chloride, tartaric acid and gelatine, dried in the dark, are insoluble, but become soluble in sunlight." Perhaps it may be, that, being dried in the dark, the molecules of the compound combine in a more solid and compact form, their solidification not being retarded by undulatory vibration and consequent agitation of the particles.

Another peculiarity connected with the actinic rays is the powerful attractive influence exercised, not only on vegetation, but also on most volatile solids. A pea or bean, grown under a large box with a single small hole bored in the side to admit light, will travel for several feet in order to effect an exit through this aperture, however small it may be. Tulips, daisies, dandelions and numerous other flowers close themselves in the absence of light; probably owing to the cessation of the chemical decomposition of the sap. Light is absolutely necessary for the assimilation of carbonic acid, and consequent production of chlorophyll, carbon, and, of course, oxygen.

Many volatile substances, such as iodine or camphor, when exposed under a glass shade, invariably condense upon that side through which the light enters. In this case the particles already suspended in the enclosed air are, of course, influenced by undulatory vibration, which, by a mechanical process not difficult to conceive, may rapidly induce undulatory locomotion. Many metallic salts, other than those of silver and gold, are slowly reduced by the action of sunlight. This appears to be the case with uranium nitrate, and this circumstance, in addition to the fact of its reaction with potassium ferrocyanide being interfered with by the presence of ammonia, renders the use of the acetate, in the quantitative estimation of phosphates in urine, eminently preferable.

The instantaneous decomposition of the haloid salts of silver in photography by the action of actinic light, may be readily explained by the theory of unequal atomic agitation, and consequent decomposition. The influence of light upon the various colouring matters is a very wide subject, and one that cannot be entered into here. The general observation may, however, be made, that in nature the brightest and most beautiful colours are to be found in those parts of the world where the light has the greatest chemical intensity. In the tropical regions, where the sun's rays are almost vertical and actinism at its maximum, we find luxurious vegetation with its matchless colour and variety, gorgeous plumage of the birds, magnificent and beautiful animals; all pointing to the existence, not only of higher temperature, but to an activity in solar actinism immensely increased.

The part played by light in the earlier history of our globe is thus beautifully explained by that eminent scientist, Dr. Hermann Vogel, of Berlin. He says :—

"There was a time when the atmosphere was much richer in carbonic acid gas than now. When the incandescent and fluid masses that once formed our earth gradually solidified, when the aqueous vapours were condensed as seas, the atmosphere contained almost all the carbon of the earth, combined with oxygen, as carbonic acid gas. The air was, therefore, at that time, infinitely richer in carbonic acid gas than now. When, at length, the earth had cooled sufficiently for vegetation to be developed, gigantic plants shot forth from the warm ground under the influence of sunlight. They flourished exceedingly in an atmosphere so rich in carbonic acid. The carbon of the carbonic acid passed over into the form of wood, and thus for thousands of years the carbonic acid in the atmosphere was continuously diminished. Revolution of the earth's service succeeded, whole tracts were buried under sand and clay, and these forests decomposed and changed into coal. A fresh vegetation sprouted forth from the newly-formed soil, and again absorbed under the influence of light the carbonic acid of the atmosphere, to become once more engulphed. Thus the carbon from the carbonic acid of the atmosphere was stored as coal in the depths of the earth. Thus the atmosphere, by the chemical effects of light, became continually richer in oxygen, until, at length, after countless ages, it attained that wealth of oxygen which made the existence of man possible."

NOTE ON A MIXTURE CONTAINING SULPHATE OF QUININE AND BICHLORIDE OF MERCURY.

BY T. H. POWELL.

The incompatibility of sulphate of quinine and bichloride of mercury is, I think, not very generally known, and was first brought to my notice a few weeks ago when dispensing a prescription, of which the following is a copy :—

Tinct. ferri perchlor.	℥vj.
Quin. disulph.	48 grs.
Acid. hydrochlor. dil.	q.s.
Liq. hydrarg. perchlor.	℥iv.
Aqu. dest. . . . . ad	℥xij.

M.

The quinine (Howard's) was dissolved in the tincture of perchloride of iron and half a drachm of dilute hydrochloric acid added; this was diluted with water, and finally the solution of perchloride of mercury poured in, a perfectly clear straw-coloured mixture resulting. After standing a few minutes, however, a heavy white granular precipitate began to form, a considerable quantity ultimately collecting at the bottom of the bottle, and remaining undissolved after the addition of

a drachm more dilute acid. The same result followed when the mixture was made a second time, the sulphate of quinine being first dissolved in an increased quantity of acid. On examination I found the clear liquid still gave evidence of bichloride of mercury in solution, and the precipitate, as might have been expected, proved to be a double chloride of mercury and quinine. We may, perhaps, infer, as the dispenser is directed to use "a sufficient quantity" of dilute hydrochloric acid, that the writer of the prescription was aware of the formation of a precipitate, but believed it was merely due to the inability of the tincture to retain the quinine salt in solution; the addition of the acid, however, does not effect the desired result. I find no mention of the incompatibility of these salts in Squire's 'Companion,' and Pereira merely says a salt of quinine is precipitated on the addition of tannic acid, ammonia, perchloride of mercury and perchloride of platinum, a statement likely to mislead when the character of the respective precipitates is taken in consideration.

I would, therefore, draw attention to the fact that when mercuric chloride and quinine salts are combined in a mixture they form a very sparingly soluble double chloride, which, unless the quantities are small, will be partially precipitated even in the presence of free hydrochloric acid. The dispenser should therefore direct the bottle to be shaken, for however bright the mixture may be when first made up, a precipitate, dangerous because of its weight, may separate after the lapse of some little time.

MEDICATED TABLETS.*

BY G. H. DUBELLE, PH.D.

(*Concluded from page* 929.)

Eucalyptine Tablets.

	Parts.
Powdered double-refined sugar	700
Extract of eucalyptus	120
Rose conserve	80
Mucilage	70
Triple extract of rose	20
Tincture of eucalyptus	10

Gingerine Tablets.

	Parts.
Powdered double-refined sugar	800
Powdered Jamaica ginger	80
Mucilage	70
Grated fresh lemon peel	20
Tincture of vanilla	20
Essence of cinnamon	10

Ginger-Malt Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of malt	200
Powdered ginger	70
Mucilage	70
Grated fresh lemon peel	30
Essence of lemon	20
Triple extract of roses	10

Indian Tamar Tablets.

	Parts.
Powdered double-refined sugar	600
Pulp of tamarinds	200
Powdered senna leaves	100
Mucilage	70
Essence of coriander	20
Essence of lemon	10

* From the *Druggists' Circular*, March.

Japanese Cinnamon Tablets.

	Parts.
Powdered double-refined sugar	800
Powdered cinnamon	80
Mucilage	70
Powdered vanilla	20
Triple extract of roses	20

Lactart Tablets.

	Parts.
Powdered double-refined sugar	700
Lactart	140
Mucilage	70
Orange blossom conserve	20
Rose conserve	20
Powdered vanilla	20
Extract of orange flower	20
Essence of lemon	10

Lacticine Tablets.

	Parts.
Powdered double-refined sugar	700
Lactic acid	200
Mucilage	70
Essence of orange peel	30

Lacto-Iron Tablets.

	Parts.
Powdered double-refined sugar	800
Lactate of iron	80
Mucilage	70
Powdered cinnamon	20
Essence of peppermint	20
Essence of cinnamon	10

Lavender Blossom Tablets.

	Parts.
Powdered double-refined sugar	600
Lavender blossom conserve	200
Rose conserve	100
Mucilage	70
Essence of lavender	20

Milan Vanilla Tablets.

	Parts.
Powdered double-refined sugar	800
Powdered vanilla	80
Mucilage	70
Powdered cinnamon	20
Tincture of balsam Peru	10

Mitcham Peppermint Tablets.

	Parts.
Powdered double-refined sugar	800
Mucilage	70
Conc. essence of peppermint	60
Corn starch	50
Acetic ether	10
Essence of Jamaica ginger	10

Orange Blossom Tablets.

	Parts.
Powdered double-refined sugar	600
Orange blossom conserve	120
Grated fresh orange peel	120
Mucilage	70
Rose conserve	60
Triple extract of roses	20
Essence of cinnamon	10

Orange-Malt Tablets.

	Parts.
Powdered double-refined sugar	600
Grated fresh orange peel	150
Extract of malt	150
Mucilage	70
Extract of orange flower	20
Tincture of vanilla	10

Pancreatine Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of malt	150
Pancreatin	150
Mucilage	70
Essence of aromatic spice	30

Peach Blossom Tablets.

	Parts.
Powdered double-refined sugar	600
Peach fruit conserve	300
Mucilage	70
Extract of peach blossom	20
Essence of bitter almonds	10

Pepsin-Bismuth Tablets.

	Parts.
Powdered double-refined sugar	600
Powdered vanilla chocolate	120
Subnitrate of bismuth	120
Mucilage	70
Saccharated pepsin	60
Essence of cinnamon	30

Pepsin-Malt Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of malt	180
Saccharated pepsin	120
Mucilage	70
Essence of aromatic spice	30

Pinusine Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of liquorice	120
Pine-needle extract	90
Mucilage	70
Extract of malt	60
Powdered opium	30
Essence of fennel	30

Red Carnation Tablets.

	Parts.
Powdered double-refined sugar	600
Red carnation conserve	200
Rose conserve	100
Mucilage	70
Extract of rose carnation	20
Essence of cloves	10

Rose-Malt Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of malt	150
Rose conserve	150
Mucilage	70
Triple extract of roses	30

Seidlitz Tablets.

	Parts.
Powdered double-refined sugar	600
Powdered sulphate of magnesia	180
Mucilage	70
Powdered sulphate of soda	60
Powdered bicarbonate of soda	60
Triple extract of rose	20
Essence of orange	10

Serapion Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of liquorice	200
Chloride of ammonium	100
Mucilage	70
Essence of anise	30

Sicily Lemon Tablets.

	Parts.
Powdered double-refined sugar	700
Grated fresh Sicily lemon peel	150
Mucilage	70
Sicily lemon juice	50
Essence of Sicily lemon peel	30

Sevilla Fruit Tablets.

	Parts.
Powdered double-refined sugar	700
Grated fresh orange peel	90
Mucilage	70
Grated fresh lemon peel	60
Orange juice	50
Triple extract of roses	20
Citric acid	10

Stomachine Tablets.

	Parts.
Powdered double-refined sugar	600
Powdered aromatic spice	180
Grated fresh orange peel	90
Mucilage	70
Powdered vanilla	30
Tincture of cardamom	30

Tonic Malt Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of malt	150
Mucilage	70
Extract of cinchona	60
Grated fresh orange peel	60
Citrate of iron	30
Compound tinct. of cinnamon	30

Vanilla-Malt Tablets.

	Parts.
Powdered double-refined sugar	600
Extract of malt	200
Mucilage	70
Powdered vanilla	70
Powdered cinnamon	30

Extract of Almond Blossom.

	Parts.
Deodorized alcohol	400
Extract of heliotrope	300
Extract of orange flower	100
Extract of jasmin	100
Conc. ess. of bit. almond (1–9)	60
Extract of rose	30
Oil of lemon	10

Extract of Cherry Blossom.

	Parts.
Extract of peach blossom	840
Extract of violets	140
Conc. essence of bitter almond	20

Extract of Lavender Blossom.

	Parts.
Conc. essence of lavender (1–7)	700
Triple extract of rose	300

Extract of Peach Blossom.

	Parts.
Deodorized alcohol	430
Extract of orange flower	400
Extract of jasmin	100
Conc. essence of bitter almond	30
Oil of lemon	20
Tincture of balsam Peru (1–9)	20

Aromatic Spice Powder.

	Parts.
Powdered cassia	500
Powdered Jamaica ginger	200
Powdered cloves	100
Powdered cardamom	100
Powdered galangal	100

Essence of Aromatic Spice.

	Parts.
Deodorized alcohol	800
Powdered coriander	60
Powdered cinnamon	40
Powdered pimento	40
Powdered calamus root	20
Powdered cardamom	20
Powdered long pepper	20

Macerate for two weeks and filter.

Extract of Red Carnation.

	Parts.
Triple extract of rose	450
Extract of orange flowers	200
Extract of acacia	200
Tincture of vanilla	100
Conc. essence of cloves	50

THE BITTER WATERS OF HUNGARY.*

Patriotic Hungarians are grateful to nature for having made the capital of their country the source and centre of many and varied mineral springs. No city is more favoured than Buda-Pesth in this respect. In other countries than Hungary the inhabitants of the capitals have to leave them, and they must often make long journeys if they wish to drink and bathe in mineral water at the fountain head. The inhabitants of Buda-Pesth have many and some unique healing springs almost at their doors, while strangers travel far to profit by the benefits which they can enjoy without leaving home. The capital of Hungary is one of the best frequented watering-places in the world.

The springs in and near to Buda Pesth consist of three classes. First, there are sulphurous springs ; secondly, there are ferruginous waters ; and thirdly, there are the bitter waters, which cannot be found in greater strength, purity, and abundance elsewhere. Though my intention is to give a detailed account of these bitter waters and of the place where they abound, I may preface it with some particulars about the other springs, which are less known out of Hungary than they deserve to be.

For those readers who have not visited Buda-Pesth it may be useful to state that the city is divided into two parts by the Danube, and united by three bridges. Pesth is on the left bank of the river, and, though the handsomer and more imposing of the two parts, has no mineral spring of importance. Between the two and above the bridge, higher up the river, is Margaret Island, where mineral water issues from the earth at the rate of 180,000 cubic feet in the twenty-four hours. On the right bank is Buda, or Ofen as it is called in German, and here the most important, as well as some of the oldest, springs are to be found. Margaret Island is about a mile in length by about a quarter of a mile in breadth. In olden days it was a royal hunting ground, and was known as Hare Island. At the middle of the thirteenth century King Béla IV. built a church and a convent on the island ; the ruins of both still remain. Margaret, the king's daughter, entered the convent, and died there in the odour of sanctity in 1271. The island was named after her. As is well known, the virtues of good Catholics, like those of good wine, mature with age ; besides, they become magnified by tradition, and thus it was, perhaps, that nearly three centuries after Margaret's death she was elevated to the dignity of a saint.

The hot mineral water which is now the chief attraction on Margaret Island is a discovery of comparatively recent date, and was the result of sinking an artesian well. The water is sulphurous in character, and is used both internally and externally. Though smelling strongly of sulphur it has not an unpleasant taste. The bath house is a large and handsome building, and the Hungarians think that there are few finer establishments of the kind. It contains upwards of one hundred separate baths in stone, marble, porcelain and metal. The floors of the bath rooms are formed of red marble. Besides the mineral water baths electric and other baths are contained under the same roof. Indeed, it is not without justice that this bath house is pronounced one of the finest and most comfortably arranged to be found anywhere. The grounds in front of it are beautifully laid out and kept in perfect order. Archduke Joseph, who has been the proprietor of Margaret Island for several years, deserves credit for what he has done there, all the improvements being due to him. Besides beautifying it and providing luxurious bathing accommodation, he has built two hotels for the reception of visitors who prefer living on the spot to journeying backwards and forwards by boat from the city. At the end nearest the city, and adjoining the first landing-stage for the steamers plying between it and the island, there is a large restaurant and concert room. Here people come to hear the music, to dance and enjoy themselves, so that the island is a place of daily resort for amusement, as well as one to which invalids go for relief.

Another island, smaller than this one, and connected with it and the left bank of the river by two iron bridges, also contains a mineral water bath house, to which the mineral water is conveyed through pipes from an artesian well. It is called Palatine Island ; the artesian well is in the Stadtwäldchen. This well took upwards of nine years to sink, and is reputed to be the deepest artesian well in the world. The mineral water issues from it at a temperature approaching boiling-point, a cloud of steam showing the place where the water rises. Far more noteworthy for the historical student is the fact that near the spot where this well has been bored is the meadow wherein from the tenth to the fourteenth century the Hungarian Parliament met and deliberated under the canopy of heaven. There is no record of any member complaining of the ventilation being bad, and the sittings being too protracted.

In Buda or Ofen the baths and springs have many historical associations. They have been known and used for eighteen centuries. Remains from the time that the Romans occupied this place indicate considerable physical changes in the ground. Nevertheless, some of the baths used by them are in use now, and the sulphurous water which they considered curative retains the same reputation. Chief among these baths is the Kaiserbad. After the Roman occupation was over, this bath was beautified by the Hungarian King, Matthias Corvinus. When the Turks were masters of Buda this bath was enlarged by Mahomed Pasha. Not far distant from the Kaiserbad is to be seen, in the midst of a vineyard, the tomb of a Turkish holy man, which is still an object of pilgrimage for pious Mahomedans out of the remote East. Centuries have elapsed since the tomb was erected. Its preservation is owing to a special provision in the treaty of peace made in 1699, after the rule of the Turks in Buda was ended by the victories of the Christians. The Romans, the Tartars and the Turks have waged war in turn at Buda-Pesth. Both the Romans and the Turks have left behind them some not unpleasant memories, and many tokens that they were civilized and versed in the arts of peace and the pleasures of life. The Tartars, on the contrary, have left nothing to mark their passage and power save traditions of their savage cruelties, and of their ferocity as destroyers.

The Kaiserbad contains not only mineral water, but also Roman and vapour baths, and a large swimming bath. Everything is designed for comfort, and pleasure is combined with it. A band plays several times daily during the season, which lasts from the middle of May till the middle of September. During the winter the chief frequenters of it are the citizens of Buda-Pesth, and the vapour bath is then chiefly used. The purposes for which persons resort to the baths I have named, and others of less importance which I need not describe, are to obtain relief from chronic gout and rheumatism, catarrh of the chest and stomach, constipation and intermittent fever. I should add that there are some iron springs in Pesth which are used for bathing, but they are not specially remarkable. Wherever one travels in the Austro-Hungarian Empire one finds Giesshübler water, which comes from a place of that name in Bohemia, the favourite drink at table, where it is taken plain or mixed with wine. Many other table waters are in rivalry with it, and the citizens of Buda-Pesth lay much store upon one which was discovered in 1879 at Moha, and which is

* From the *Times*.

called St. Agnes water. Being assured that it was quite as good as Giesshübler I tried it, but I was not convinced. St. Agnes water is a pleasant beverage, but Giesshübler is pleasanter still, and, I should think, much more wholesome.

Having briefly described the principal mineral baths and springs in the Hungarian capital I shall proceed to describe the bitter waters, which possess even more general interest and which are a short distance from it. Half an hour's drive on the right bank of the Danube brings one to the spot where these waters are found. They are in a wide plain, and on the slopes of the hills which rise on one side are vineyards, where the grapes grow from which the wine Ofen Adelsberg is made, a wine which is classed among the best produced in Hungary. Unlike several mineral springs nearer the city, the bitter waters were not discovered till the year 1853. The famous Sprudel at Carlsbad is said to have been accidentally made known by a dog; the spring at Teplitz is said, probably with as great truth, to have been found by an intelligent pig; at Homburg the fondness of horses and cattle for the water in the marsh where the Elizabeth, Louisa, Ludwig and other springs now attract drinkers first made known the fact that the water had peculiar virtues. Indeed, some fable or strange tale is associated with the discovery of most mineral springs. No miracle was wrought when the existence of the bitter waters was made known. The story is both simple and true. About the year 1853 an inhabitant of Buda or Ofen was the proprietor of the ground upon which the Queen Elizabeth Salzbad now stands. He was named George Schleiss, and he was a market gardener. The only water accessible was at some distance from his garden, and he required much of it in the hot weather to water his vegetables. Unless the ground be plentifully watered during the hot months no plants will thrive in this locality. Accordingly he dug a well to the depth of thirty feet and found water in abundance. As it had a salt taste he did not use it for drinking purposes, but applied it solely to irrigate the ground. One day a gentleman who had been out hunting was returning home, and being thirsty he drank of the water, which he at once pronounced to be highly mineralized, and he advised the proprietor of the well to have this tested by analysis. George Schleiss took some to a chemist named Francis Unger, who was so much impressed with its medicinal properties that he entered into partnership with him, and from the year 1853 the bitter water became an article of consumption and commerce.

Before the fame of this water was noised throughout the land the inhabitants of Buda-Pesth became frequent drinkers of it; they bathed in it also, and many derived much benefit. In consequence of this a bath-house and pump room had to be erected, and a few rooms were provided for those who desired to pursue the treatment on the spot. Medical men all over the Continent soon learned the medicinal value of this water and prescribed it to their patients; thus a demand sprang up for it, and searches were made for other places where it might be obtained. Several other wells yielded bitter water; but many wells were sunk in vain, and much money was wasted in attempts to find it where Nature had not been generous. As in the case of the petroleum wells in the State of Pennsylvania and the Province of Ontario, so was it in this one. For one petroleum spring which yielded a fortune, two absorbed capital. Now, however, the limits of the bitter water yielding ground have been determined, so that no one thinks of wasting time and losing money by seeking for it outside a particular area.

At present about forty wells yield bitter water, and seven persons or companies are their proprietors, and superintend the bottling and sending of it to market. The one first discovered is nearest the city; the one best known in England is the furthest from it. This belongs to Herr Andreas Saxlehner, and bears the name of Hunyadi János. If not actually introduced into England by the company which supplies Apollinaris water, this bitter water has been chiefly pushed by that company, which contracted to take a certain number of bottles yearly. Before noticing the wells separately I may remark that the water from one resembles generally that from another. The differences are in the respective quantities rather than in the nature of the ingredients. In certain cases the bottling is conducted with greater care than in others, and this causes the water to keep longer and in better condition. Some of the wells are decidedly weaker than others. The possessors of the weaker waters cannot help themselves; but those who have several wells can combine the waters of each, and thus produce a good average strength. This is done, I believe, by Herr Saxlehner, who bottles more water than any competitor, and who has several wells on his property. It is with this bitter water as with Vöslau, the celebrated Austrian wine. The demand for one brand of that wine, called Vöslauer Goldeck, is larger than for any other; yet though the wine of one year may vary in quality, there is never any appreciable difference between one bottle of Vöslauer and another. This is understood to be arrived at through what is styled "blending." Hungarian bitter water can be, and sometimes is, "blended" also.

Next to the Hunyadi János comes the Rákóczy well, the water from which is stated to be so strong that it bears mixing largely with plain water or milk without detriment to its aperient qualities. The proprietors of this well produce a salt by evaporation which has many of the properties of Carlsbad salt. The proprietors of the Victoria well say that the water from it is stronger still. I may remark, in passing, that over the area where the bitter water is found, and in close proximity to a well containing it, a well sunk to the same depth will yield potable water which is free from all trace of mineral substances. The explanation doubtless is that all the water at a certain depth is uniform in character and is non-mineralized, but that the water in particular spots derives its mineral constituents from the strata in which it lies, or through which it passes. Three other wells may be named. They are—first, Franz Josef; secondly, Hunyadi László; and, thirdly, Æsculap. The second belongs to a French, and the third to an English company.

The principal constituents of all these bitter waters are the sulphates of magnesia, soda, and lime, chloride of sodium, and bicarbonate of soda. The percentage of carbonic acid gas is small. It is owing to the large proportion of sulphate of magnesia contained in them that they are called bitter waters, sulphate of magnesia being called "bitter salt" in German. At one time English children, as well as grown-up persons, were painfully acquainted with this salt under the name of "Epsom." But the sulphate of soda and other ingredients cause the Hungarian bitter water to be a pleasanter aperient than Epsom salts and quite as effective. Abernethy had a great dislike to the employment of Epsom salts. He used to compare the effects of taking a dose to the irruption of wild and sanguinary Arabs into a peaceful village. On the other hand, the operation of Hungarian bitter water may be likened to the action of a policeman, directing and compelling obstructionists to move on. Had Sydney Smith been alive he would have welcomed this bitter water as a blessing to men. He delighted in mild yet potent remedies. In one of his humorous passages he ridiculed an assumed attempt to cripple the French army by prohibiting the export of rhubarb. Certainly the French are fond of and, it may be presumed, are good judges of aperient medicines, and it is natural, then, that the sale of Hungarian bitter water in France should be very large. All over the Continent the annual consumption is enormous, being relatively far greater than in England, where the water is not yet so well known. I am informed that the demand increases in foreign countries at a rapid rate, and that many million bottles are dispatched annually. I have before

me a large number of testimonials from medical men in favour of this water. It seems to cure or benefit as many forms of disease as any quack medicine. I note that it has been used with remarkable results in the Imperial and Royal Hospital for Lunatics at Vienna. I fancy that none of it has yet been drunk by the Bulgarians.

I should not advise any visitor to Buda-Pesth to proceed to the place which yields bitter waters if there were nothing more to be seen than water pumped from wells and poured into bottles. Even this monotonous spectacle cannot be enjoyed at every establishment I have named, as the proprietors of some wells seem to fear lest strangers should discover hidden secrets if admitted within their premises. They certainly need not dread any one betraying an unquenchable thirst for the water itself and trying to drink a well dry. A very little bitter water goes a very long way. In this case moderation is a necessity rather than a virtue. Nor is the scenery particularly beautiful. What I found to interest me, and what might interest others also, was the fine bathing establishment belonging to Messrs. Mattoni and Wille, and called the Elizabeth Salzbad. It was here, as I have already said, that bitter water was first discovered. Here, too, persons requiring treatment went from Buda-Pesth to bathe in the water and drink it. Till the year 1881 all the arrangements were rude and primitive; now everything is done that the most fastidious visitor can desire. The baths are excellently arranged, and there is good accommodation for residents during the season, which begins on May 1 and closes on October 1. During the season omnibuses ply every half hour from five in the morning till eight at night between the Elizabeth Salzbad and Franz-Josefs-Platz in Buda-Pesth.

During the summer months many hundreds of persons sojourn at the Elizabeth Salzbad for the purpose of regular treatment under the care of the physician attached to it. Ladies are in the majority. It seems that this water is quite as efficacious in many female maladies as that of Franzensbad. Year after year the number of patients increases, and the supply of rooms is not equal to the demand. On this property, which covers eleven acres, there are ten wells. It has been ascertained that bitter water abounds all over it, so that more wells could be sunk if required. The original spring is used for drinking. It is the mildest of all the springs, and on that account can be employed with the greater ease and advantage. The water is not one to be drunk from choice, but when taken on the spot it is less unpleasant than when drawn from a bottle. As the dose is half of a small tumbler, not much time need be wasted in taking it.

The medicinal action of the bitter water when employed for a bath is said to be marked and useful in cases of gout, rheumatism, diseases of the bowels, nervous diseases, and female complaints. I took a bath, and found that the skin was slightly irritated, and also that the whole body was strengthened; but I have felt the same effects from a hot salt water bath. However, as there is no salt water near Buda-Pesth, this bitter water may be an excellent substitute, even if it be nothing more. A band plays every day near the pump room. There is also a reading room and library for the use of visitors, and a restaurant where one can dine as well as in the city. In one respect the dwellers at the Elizabeth Salzbad are better off than those who put up at a Buda-Pesth hotel, for they are not worried with too much music. At the hotels and restaurants in the city music is provided every way in over abundance. The national dance of the Hungarians is called Czardas, and resembles a Scotch reel in many things, and among them in its interminable length. Now, when a Hungarian band begins to play it never seems to know, any more than the dancers, when to stop. If a musician be tired he rests, but the others continue to produce a variety of sounds having much resemblance to the weird and wearying strains of bagpipes. Hungarian music, like Hungarian bitter water, is pleasantest in moderate doses.

Visitors to the Queen Elizabeth Salzbad have the opportunity of seeing the whole process of preparing the water for export. They may drink as freely of it as they please, a privilege which, I understand, they never abuse. There are no secrets, nor is there any affectation of mystery in this establishment. Every question I put was readily answered. I learnt that this bitter water is less known in England than others which are extensively advertised; still there is some demand for it, owing to the *Lancet* and *Medical Times and Gazette* having praised it highly. It bears two names, one being "Royal Hungarian Bitter Water," the other "Hunyadi Matthias." In Germany and Austria, where it is known as "Ofner Königsbitterwasser," the sale is large, and a considerable quantity is sent to Italy and America. In France, however, the sale is largest, owing to the Academy of Medicine having pronounced it very good, and to the leading French medical men prescribing it. It is one of the few foreign mineral waters which patriotic Frenchmen drink with satisfaction, and they drink it under the name of "Eau Purgative Hongroise."

Whether the attractions of Buda-Pesth in the shape of mineral waters are sufficient to warrant an invalid making the journey in order to undergo treatment there cannot easily be determined. It is probable that in certain cases the labour would be repaid. The city itself is well worth a visit, and the hotels are quite as fine as those of Vienna. Hungarian wine is renowned, and Hungarian cooking is, to my mind, far better than that of Germany, and in some respects superior to that of France. As is well known, the Hungarians are as proud of their language as of their country, and they speak it in preference to German. But the larger proportion of them know German also and are quite ready to converse in it. In Prague and other parts of Bohemia, where the Czechs are striving to substitute their language for that of the country at large, great reluctance is shown to speak German even by those who understand it perfectly. The visitor to Hungary is glad to find that this foolish form of patriotism is not displayed there, and he will be at no loss if he have a colloquial knowledge of the German tongue.

Considering the superabundant supply of mineral waters in and around the Hungarian capital, it may appear strange that any one should fall ill there, or, being ill, should not rapidly recover. Perhaps there would be less need for using mineral water if the ordinary drinking water were wholesomer and if drainage were better. In many streets the odours are as overpowering as the music in some of the restaurants. The drinking water is taken from the river. It is infinitely preferable to sail upon than to drink the waters of the beautiful blue Danube.

ADULTERATION OF OLIVE OIL.

In a report on the trade of Leghorn for the year 1886, Mr. Consul Inglis says: —

"The exportation of adulterated oil, in what are commonly known as Florence flasks, continues, and has indeed received a fresh development. Whereas formerly the practice of certain firms was to put in these flasks the lowest quality of olive oil (not produced in Tuscany, but coming from other districts, such as the Romagna), mixed with cotton-seed oil, of late the cotton-seed oil pure and simple has been sent, the cases being branded 'olive oil' of superlative quality. But as cotton-seed oil is to be had cheaper in England than in Italy, things have culminated logically enough in exporting the empty flasks packed in the usual cases to London, there to be filled with cotton-seed oil, and, of course, palmed off upon the public as 'olive oil' of fine quality. The reason for this state of things is not far to seek. At one time really pure and good olive oil was exported in these flasks, but over-competition and the beating down of prices by importers in England—who, be it said, care nothing

about quality, and insist only on low prices—led at first to inferior olive oil being substituted, and next to adulteration with cotton-seed oil, not to mention short measure in the flasks. Neither the flasks nor the cases in which they are packed have at any time borne the brand of the exporter, this not being allowed by the importers, as prejudicial to their particular interests; hence it followed that the best firms in the Leghorn export trade have stood exactly on the same level with the English public as the firms who resort to the practices described above, both being alike unknown to the English consumer.

"The result is now apparent. The Florence flask trade—a speciality of Leghorn, these flasks not being procurable out of Tuscany—is utterly discredited, and has been totally abandoned by the leading firms engaged in the export trade in olive oil, who refuse to lend themselves to such discreditable practices. Therefore, persons buying oil in Florence flasks may know what to expect now.

"It is not an easy matter to get the genuine Lucca oil of fine quality in England; the demand is chiefly for cheap oil, the ignorance of the public being traded upon to a great extent. If the public wish to get Tuscan, or Lucca oil, as it is generally termed, pure and of the best quality, they must look to the standing and reputation of the firm by whom the oil has been imported and bottled, and whose brand can be considered a sufficient guarantee, since, unfortunately, the leading firms in the export trade from Tuscany are unknown to the public in England. Failing these precautions they will probably get rubbish."

THE BLACK BEES OF TASMANIA AND THEIR MEDICINAL HONEY.*

In a recent communication to the Paris *Académie de Médecine*, which is published in the 'Progrès Médical' for April 16, Dr. Thomas-Caraman, of Forges-les-Eaux, reported upon a matter which must be regarded as among the most notable of the therapeutic novelties of the day, being nothing less than the discovery of a sort of honey possessing in a remarkable degree the medicinal properties of the *Eucalyptus globulus*, or of some species of *Eucalyptus*.

It seems that about three years ago a distinguished French naturalist, M. Guilmeth, who was travelling in Tasmania, came suddenly upon a grove of gigantic eucalyptus trees, from 260 to 390 feet high, and with a trunk so large at the base that it took forty of his Kanackas, joining hands, to reach around one of them. High in these lofty trees he discovered what he at first took to be enormous galls, but which he soon ascertained were the dwelling places of swarms of small black wild bees, of a variety before unknown to him. Dr. Thomas-Caraman proposes for this bee the provisional name of *Apis nigra mellifica*. Besides being black and smaller than the ordinary honey bee, this wild bee has its languet rather more developed than that of the domestic bee. M. Guilmeth attempted unsuccessfully to domesticate it in Tasmania. He caused some of these immense trees to be felled, and secured the honey. The largest individual store of honey weighed as much as 11,000 pounds avoirdupois.

The honey is described as a thick, homogeneous, somewhat transparent, syrupy liquid, of a deep orange colour; having an odour suggestive at once of its containing eucalyptus principles; very soluble in water, in milk and in wine, but much less soluble in alcohol; and very difficult of fermentation. Its specific gravity is 1·44, and it rotates the polarized ray 22°. In round numbers 1000 parts contain 611 of invert sugar (mostly levulose), 2 of ash, 215 of water, and 171 of active principles, including eucalyptol, eucalyptene, terpene, cymol, and odorous, resinous and colouring matters. Its taste is described as very pleasant. Administered to dogs, to the amount of from 2½ ounces to 5 ounces a day, it slows the heart's action, and this effect soon becomes so pronounced as to suggest, in Dr. Thomas-Caraman's words, a struggle between the pneumogastric nerve and the cardiac ganglia. At the same time the temperature falls about 1° C. The effects last for at least twenty-four hours, and include a slight tendency to sleep, but without any symptom of toxic depression. As the result of experiments on himself and on one of his friends Dr. Thomas-Caraman states that on taking a tablespoonful of the honey in a little tepid water or milk, after a few minutes one perceives a gentle agreeable warmth take possession of the whole person. At the end of half an hour the elimination of the active principles by the air passages having begun, the voice becomes clearer and the breath perfumed; the lungs feel more elastic, more supple. Having continued the use of the honey for a week, four tablespoonfuls daily, the author who speaks of himself as respectably fleshy, found that he could go up two pairs of stairs, two steps at a time, without stopping to take breath or feeling at all blown. At the same time there was slight diuresis with an increase of urea, and the urine had a decided odour suggestive of that of the *Acacia farnesiana* (the plant from which the perfume called "new mown hay" is made).

Besides his observations of the physiological action of the honey, the author cites certain trials of it as a medicine. These data lead him to consider it a valuable aliment; an efficient and palatable substitute for cod liver oil; an anticatarrhal; an agent affecting the heart in a manner comparable to the action of digitalis, but free from the inconvenient properties of that drug; a febrifuge; an antiparasitic specially applicable to the destruction of the micro-organisms of tubercular and scrofulous neoplasms, the *Leptothrix vaginalis*, and oxyures; and, finally, an antiblennorrhagic, by virtue of its being more actively eliminated by the uro-genital tract than either copaiba or sandal oil. It is destined, he thinks, to play a great part in the treatment of laryngeal, bronchial, pulmonary, cardiac, and scrofulous affections; in malarial and typhoid fevers; in whooping cough and influenza; and in renal, vesical, and vaginal troubles.

It may be said that Dr. Thomas-Caraman holds up to our view a somewhat rose-coloured picture, but it must be confessed that there is no inherent improbability in the notion that an animal organism like that of the bee may be able to elaborate the medicinal principles of the eucalyptus in greater perfection than the art of pharmacy can furnish them. Should his impressions be confirmed, however, the practical question at once comes up as to the extent to which commerce can supply us with the genuine wild honey of Tasmania, and it is much to be feared that in case of any considerable demand, we shall witness a repetition of what took place in connection with the supply of Chian turpentine, and more recently that of alveloz—the substitution of products more or less adulterated, if not wholly factitious. It would be interesting to know to what particular species of the genus *Eucalyptus* the gigantic trees found by M. Guilmeth belong. Perhaps the active principles of the tree may yet be made available without the intervention of the *Apis nigra mellifica*.

* From the *New York Medical Journal*.

FORMATION OF ALBUMINOIDS.

Herr K. O. Müller has investigated the mode of formation of albuminoids, especially of asparagin, in a variety of plants, and has arrived at the following conclusions. Asparagin is formed in the dark, and disappears again in the light, but has no pathogenic properties. Its formation does not appear to depend on the absence of carbohydrates. Its formation commences as soon as the process of assimilation is suspended; it is a secondary product of assimilation, being formed out of the carbohydrates, and the nitrogenous inorganic constituents of plants.

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POLLEN GRAINS AND HAY FEVER.

THREE years ago attention was called, in these columns, to a pamphlet containing the substance of an interesting lecture on hay fever that had just previously been delivered by Dr. MORELL MACKENZIE. In that lecture, after discussing some of the multitudinous theories that have been put forward from time to time in respect to the cause of this apparently trivial—but to those who suffer from it decidedly inconvenient—complaint, Dr. MACKENZIE showed a decided leaning towards one which pointed to a relation of cause and effect existing between pollen grains and hay fever. The intervening three years have not only sufficed to develop the pamphlet into a respectable volume,* but they have also yielded a considerable increase to previously existing knowledge on the subject, part of which has been contributed by Dr. J. N. MACKENZIE, of Baltimore, whilst within the last few days Sir ANDREW CLARK has devoted a "Cavendish Lecture" to the treatment of hay fever. Sir ANDREW CLARK, while recognizing the value of the investigations of Drs. BLACKLEY and MACKENZIE, does not agree that the pollen of grasses is the sole factor, though he admits it is a most important exciting agent of paroxysms of hay fever, and he lays more emphasis upon the conditions obtaining in some persons which render them more susceptible to the influences that provoke hay fever. Dr. MACKENZIE, however, now unhesitatingly defines hay fever as "a peculiar affection "of the mucous membrane of the eyes, nose and air "passages, giving rise to catarrh and asthma, almost "invariably caused by the action of the pollen of "grasses and flowers, and therefore prevalent only "when they are in bloom." Further investigation has also confirmed the opinion that sufferers from hay fever are victims to an idiosyncrasy, though in what the idiosyncrasy consists has not been satisfactorily made out. Not only does the complaint seem to have originated in this country, and to be practically limited to members of our particular branch of the human race, especially those resident in this country and in the United States, but it shows a marked preference for persons of cultivation. Sir ANDREW CLARK refers to it as choosing the man before the woman, the educated before the ignorant, the gentle before the rude, and the courtier before the clown; further, as preferring the temperate to the torrid zone, the city before the country, and the Anglo-Saxon before all other races. It may be that in this there will be found some compensation for the infliction, and it has been somewhat banteringly suggested that when this idea of the intimate connection between hay fever and culture has been firmly grasped by the public mind, the complaint will, perhaps, come to be esteemed, like gout, as a sign of breeding. Dr. MACKENZIE, moreover, considers that it has now been clearly shown that the complaint is of quite recent growth, and that it is doubtless one of the earliest products of the "plague of nerves" which seems to have fallen on this country, though it is hardly consistent with popular views as to the distribution of this "plague" to learn that men are three times more liable to the disease than women. However, now that the cause of the complaint is better understood, it follows that methods of treatment for its prevention and cure should become more rational, and an important part of the new volume, as well as of Sir ANDREW CLARK'S lecture, is devoted to this subject. But since it does not lie with us to discuss medical methods, it must suffice here to say that some of them depend upon the mechanical prevention of access of pollen grains to susceptible mucous membrane, and others upon the use of agents for the relief of irritation already set up, among which the ubiquitous cocaine stands prominent.

Of course, if it be granted that pollen grains constitute the determining cause of hay fever the source of the mischief must be looked for among the plants that depend for their fertilization upon the action of the wind, of which the Graminaceæ form an important group. At one time it was thought that the sweet-scented vernal grass (*Anthoxanthum odoratum*) and the oat-like soft grass (*Holcus avenaceus*) were especially pernicious in this respect. But there seems now to be no good reason to suppose that their pollens are more active than those of the meadow foxtail (*Alopecurus pratensis*) and of some species of *Poa* and *Lolium*. The pollen of rye is considered to be still more potent than some of these, and the pollens of wheat, oats, and barley are said to be also very active. The six grasses named by Dr. MACKENZIE as the most productive of hay fever in this country are *Anthoxanthum odoratum*, *Holcus avenaceus*, *Alopecurus pratensis*, *Poa fertilis*, *Poa trivialis*, *Poa nemoralis* and *Lolium perenne*. To the pollen grains of these plants and their allies the greater part of the mischief is thought to be attributable, for although some cases of hay fever occurring early in the year may be referable to pollen

* 'Hay Fever and Paroxysmal Sneezing: their Etiology and Treatment.' With an Appendix on Rose Cold. By Morell Mackenzie, M.D. Lond., etc. Fourth Edition. London: J. and A. Churchill.

from pines and other anemophilous trees, it is estimated that during the period of the year in which hay fever chiefly prevails as much as 95 per cent. of the pollen grains suspended in the atmosphere is derived from Graminaceous plants. Some attempts have been made to estimate the number of pollen grains diffused through the atmosphere by counting with the aid of a microscope the grains deposited upon slips of glass coated with a sticky composition and exposed to the atmosphere under varying conditions. The numbers were found to be largely affected by time of the year, temperature, wind and rain, as well as by locality. Even in the midst of a vast expanse of meadow land and in the middle of summer they fluctuated greatly within a short time, rising gradually to the highest point at the end of June and falling off rapidly in July. In June the number of grains deposited daily on a square centimetre of exposed glass varied from 20 on the 17th to 1250 on the 25th. The former day was rainy, with a temperature of 103° in the sun; the latter day was showery and windy, with a temperature of 67°, but it had been preceded by one that was extremely fine and hot and hay-cutting had been commenced in some of the neighbouring fields. Glasses exposed in the early morning on the 12th of July, during a two hours' railway journey from London to Bognor, showed a deposit of 28 grains to the square centimetre, and later in the same day 37 to the square centimetre were deposited during a journey from Bognor to Brighton. Even in the "long unlovely" streets of Marylebone deposits of 14 and 15 grains to the square centimetre were observed on the 24th and 27th of June. Across the Atlantic, however, the pollens of grasses do not appear to exercise so powerful an influence, their place as the alleged chief factors of hay fever being taken in the United States by the pollen of a composite plant, the *Ambrosia artemisiæfolia*. This plant, which is widely distributed and grows abundantly, blossoms in August and September, the time when hay fever most prevails in the United States. It is not an European plant, but Dr. MACKENZIE suggests whether some cases of hay fever that occur in this country near the seaside may not be due to the pollen of the nearly-allied plant *Artemisia maritima* or its variety *Artemisia gallica*. Another plant that is credited with being an offender in this direction is the rose, and several cases are reported in which an analogous catarrh, known as "rose cold," was coincident with and apparently dependent upon the neighbourhood of roses in bloom.

In explanation of the mechanism of the disease it has been suggested that the granules of the pollen cells, which are much smaller than blood corpuscles, enter the blood vessels by actual penetration of the walls, and that it is not improbable that the *malaise* experienced in hay fever is due to the presence of this granular matter in the general circulation. But Dr. MACKENZIE thinks it probable that the action of pollen in producing hay fever is dependent more on its vital than on its chemical or physical properties, and that as a living organism, capable of undergoing some degree of development when deposited on mucous membrane more or less exposed to the air, it possesses exceptional characters. Experiments have shown that even on persons not ordinarily subject to hay fever pollen is capable of exercising a peculiarly irritating action. The pollen of any of the previously-mentioned grasses, when rubbed into the nasal mucous membrane of a healthy person, has been found to produce a feeling of stuffiness in the nose that comes on in the course of an hour or two and lasts several hours, the sensation being like that experienced at the commencement of a cold, but without sneezing or running from the nose. Indeed the effect thus produced by pollen upon "non-susceptible" persons is said to exceed that resulting from the use of tannin, alum, and many substances of much stronger chemical character.

The motion for going into Committee on the Pharmacy Acts Amendment Bill now stands among the House of Commons' orders of the day for Tuesday next.

* * *

Last week, in calling attention to the announcement that the list of subscriptions and donations in response to the special decennial appeal on behalf of the Benevolent Fund would be kept open for two months longer, we expressed the hope that the liberality of the Council in setting aside the sum of £240 for "Jubilee gifts" to the annuitants would be compensated by further special contributions to the Fund. We are able to state that during the week several donations from firms have been received, and one of these, for the handsome sum of one hundred pounds, was accompanied by a letter written in so admirable a spirit, that we are pleased to have the opportunity of reproducing it here:—

"56, Hanover Street, Liverpool,
"*June* 7, 1887.

"Richard Bremridge, Esq.,
"Secretary, Pharmaceutical Society of Great Britain,
"17, Bloomsbury Square, London, W.C.

"Dear Sir,—We shall have much pleasure in giving a donation to the Benevolent Fund of the Pharmaceutical Society, and this being the Jubilee year of Her Majesty's reign we have decided to give more than we would have done under ordinary circumstances. You can therefore put the name of our firm down for £100 (one hundred pounds).

"The claims of this Jubilee year are numerous, but our feeling is that all firms in showing their appreciation of any prosperity they may have enjoyed during Her Majesty's reign, cannot do better than support any benevolent institutions which may exist in connection with their own particular business. We trust others in the trade may see their way this year to give special subscriptions, and in this way help to put the Benevolent Fund of the Pharmaceutical Society on a thoroughly good basis. "Yours faithfully.

"EVANS, SONS AND CO.

"P.S.—We will hand you the cheque on Jubilee day, June 21."

* * *

An inability on the part of vendors to distinguish clearly the dividing line between alcoholic medicines and alcoholic beverages has occasionally entailed in this country inconvenient interposition on the part of the Inland Revenue authorities. But the

inconvenience is infinitesimal compared to what must obtain in Kansas, where a new liquor law requires that any person wishing to open a drug store must secure—not an educational qualification, but—the signatures of twenty-five women to a petition to that effect! The explanation of this strange anomaly is that, in the words of the *Texas Druggist*, in States where prohibitory liquor laws have been enacted, drug stores have largely taken the place of drinking saloons. Our contemporary, contemplating the possibility of similar legislation in Texas, says it will be followed by the doubling of the drug stores in every town, the proprietors of which will keep a small stock of drugs to make their calling plausible. But their chief commodity will be a stock of ready-written prescriptions for "spiritus frumenti, Oj.," requiring only the name of the patient to be filled in as an authority for dispensing. As to finding medical men in the towns of the State who will, for a consideration, sign such blank prescriptions by the dozen, there seems to be no doubt.

* * *

A correspondent writing from Victoria says that during the last few months a number of assistants have landed in Australia, probably induced to leave England by some correspondence that appeared in this Journal, some of whom would probably like to be home again. It has come within his knowledge that one wholesale house in Melbourne has the names of twenty-four assistants wanting situations, twelve of whom were qualified, and most of whom had recently arrived from home.

* * *

Glasgow is to furnish the site of an international exhibition to be held next year under the immediate patronage of Her Majesty the Queen, the guaranteed fund for which has already reached nearly a quarter of a million sterling. The site which has been granted by the city corporation extends to about sixty acres, of which about ten acres will be covered by the exhibition buildings; it comprises the western portion of the Kelvingrove Park and the slopes of Gilmorehill, which are crowned by the University buildings. The exhibits will be grouped in twenty-two classes, of which probably those most interesting to the readers of this Journal will be "Class XII., Chemistry and Apparatus, Processes, and Appliances connected with Applied Chemistry and Physics; Philosophical Instruments and Apparatus;" and "Class XIII., Food (including drinks)."

* * *

A meeting of the Chemical Society will be held on Thursday, June 16, at 8 p.m., when a ballot will take place for the election of Fellows, and the following papers are to be read:—"The Thermal Constants of a Liquid Mixture," by Professor W. Ramsay and S. Young; "Derivatives of Hydrindonaphtene and Tetrahydronaphthalene," by Dr. W. H. Perkin, jun; "The Formation of Closed Carbon Chains in the Aromatic Series," by F. S. Kipping, B.Sc., and W. H. Perkin, jun.; "The Action of Ethylene Bromide on Ethylic Sodacetoacetate," by P. C. Fraser, Ph.D., and W. H. Perkin, jun.; "Derivatives of Pentamethylene," by H. G. Colman, Ph.D., and W. H. Perkin, jun.; "Derivatives of Hexamethylene," by P. C. Freer, Ph.D., and W. H. Perkin, jun.; and "An Attempt to Synthesise a Carbon Ring containing Seven Carbon Atoms," by P. C. Freer, Ph.D., and W. H. Perkin, jun.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The stated monthly meeting of the Council was held on Wednesday, the 1st inst.

Present—Messrs. Wells, Beggs, Brunker, Hayes and Simpson.

As a quorum failed to attend, no business was transacted.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The last general meeting of the thirty-eighth session was held at the Royal Institution on Thursday evening, April 28. The President, Mr. A. C. Abraham, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed and several donations announced. A vote of thanks to the respective donors was passed unanimously. A special vote of thanks to the Pharmaceutical Society for a donation of cinchona stems was passed, and the Honorary Secretary was requested to convey the same to the Pharmaceutical Society.

The President now delivered the following—

Valedictory Address.

BY A. C. ABRAHAM, F.C.S.

Gentlemen,—In vacating the chair which I have had the honour of filling as your President during the last two sessions, I cannot claim, as some of my predecessors might perhaps have done, any lack of subject material for a few remarks to you. The past two years have, indeed, supplied ample material for consideration. In the domain of pure chemistry there has been a fair amount of advance, and in that of pharmacy there has been much of novelty.

With regard to pure chemistry I feel hardly competent to say much. Among those of you interested in this branch each would regard those investigations which are of special interest to himself as the most noteworthy, and it is really only those who are themselves engaged almost exclusively in pure chemical research who are in a position fairly to award the palm amongst the discoveries made and the investigations carried out. I may perhaps, however, allude to the discovery by Winkler of the last new element, germanium, which fills one of the gaps in what is known as Mendlejeff's system. The discovery of this element is, of course, of greater interest on account of its existence having been to a certain extent foretold; and, as a comet, which, having been invisible for hundreds of years, reappears at the exact time calculated by the astronomer, proves the accuracy of his calculations and the theories upon which they are based, in the same way the discovery of this element is an almost perfect proof of the accuracy of the theories upon which its existence, or, rather, the probability of its existence, was calculated.

I think I may fairly include the wonderfully complete investigations of Warington upon nitrification amongst the most important of recent investigations. As Darwin showed the wonderful value of the earthworm as a means of promoting the life of plants, so Warington has shown us that without the minute organisms with which the soil teems the life of plants such as now cover the earth would be impossible. He has indeed shown that without the aid of these organisms the nutriment necessary for the development of plants obtainable from the *debris* of previous growths as well as from the inorganic constituents of the soil would be entirely unavailable for their requirements.

I will not detain you further upon questions of this nature, but pass on at once to matters of more interest to those present. I have not hitherto alluded in any

way to the advances made in the domain of analytical chemistry, but I think we should hardly forget that the last year or two has seen some striking changes in this department of chemistry, many of them indeed of great interest both to the analytical chemist and to the pharmacist. Among the former I may mention Adams's method of milk analysis which has been adopted by the Society of Public Analysts. This process, which is founded upon a principle introduced by myself in a paper which I had the honour of reading before this Association in 1883, has received general approval, and, although I believe capable of improvement, seems likely entirely to supplant the process previously generally employed, viz., Wanklyn's, which although defended for a long time by those who had been in the habit of relying upon it, was necessarily an exceedingly crude and uncertain one. It is indeed surprising, after the many demonstrations of its uncertainty, that it should so long have held its ground.

Among the many new analytical processes of special interest to pharmacists, Allen's process for the supposed estimation of nitrous ether in the spiritus ætheris nitrosi of the British Pharmacopœia is conspicuous. I say, "supposed estimation of nitrous ether" in this preparation, because I venture to think that it has yet to be proved that nitrous ether is the only, or perhaps even, I may say, the most important nitrogenous compound present in that preparation, and estimated by it. The process is, however, undoubtedly a most convenient one for estimating certain compounds present in it when freshly made by the process of the Pharmacopœia, and also many other compounds, for example nitrite of amyl, whilst the apparatus is extremely convenient for the estimation of peroxide of hydrogen, urea, the carbonic acid in many carbonates, and in spirit of sal volatile. The processes adopted in the new Pharmacopœia for standardizing the preparations of nux vomica, opium, and cinchona bark, mark a most important advance in pharmacy, whilst the many comparatively simple processes which have been perfected, or, at least developed, for the estimation of emetine and the alkaloids of belladonna must not be overlooked.

Before leaving the subject of analytical chemistry, one should hardly omit to mention the various investigations respecting an interesting class of poisonous bodies of an alkaloidal nature, the so-called ptomaines, respecting which much investigation has recently gone on, resulting amongst other things in the isolation of a body of this nature from tinned fish, which at once enables us to account for some of the mysterious cases of poisoning hitherto thought, on the very slenderest grounds, to have been due either to the solution in minute quantities of tin, from the chloride of zinc employed in soldering the vessels, or by some imputed to the paint used for coating the outside of such vessels. These theories were extremely weak, and of course did not account for the cases of poisoning from fish which had never been tinned, and they will hardly now be resorted to after the discovery which I have named.

Pharmacy has been enlarged, if not altogether enriched, during recent years by a remarkable number of additions to the classes of bodies acting as antiseptics and antipyretics, sedatives, and also by a number having an action upon the heart. Among the former most have been discovered in the so far futile endeavour to find a process for the artificial production of quinine. They are therefore chiefly more or less closely connected with phenol. Amongst these may be named antipyrin, antifebrin and antithermin, and, although less directly antifebrile, salol. The synthetical preparation of quinine has indeed been directly claimed as the result of the researches of a countryman of our own, but so far it cannot be said that his promises have been realized. At the present price of quinine it is indeed doubtful whether if it could be manufactured artificially it could be produced at a lower price than when prepared from cinchona bark.

The number of products having, or said to have, properties either similar to, or superior to quinine, can hardly be equalled by the number of sedatives of all kinds which have recently come into use. These have been derived from very various sources. Amongst them I may name urethan, cocaine, hypnone, paraldehyde, whilst bromide of sodium has much increased in favour in this country. The heart, too, has received an immense amount of attention, most of the compounds which have been used either in the pure or crude forms to regulate its action being, like the active principles of digitalis, of a glucosidal nature. Amongst these may be named convallaria and strophanthus, whilst sparteine, derived from one of the brooms, is an alkaloid. Convallaria, although introduced for use in dropsical heart affections, seems now to be used, when it is used at all, simply for its action upon the heart without the other actions which accompanied it, and rendered it valuable in dropsy, and it becomes an important question whether its preparations should not be devised so as to contain those principles only which have a direct action upon the heart. Strophanthus has been the source of much discussion, and a good deal of trouble to many of us, and even yet the tincture now universally adopted cannot altogether be regarded as an entirely satisfactory preparation, unless, indeed, the bitter principle left in the marc is different from that extracted, not only in composition, which seems pretty certain, but in its action, which is not yet clear. Among local anæsthetics cocaine has almost monopolized attention, and its uses seem hardly yet to have found their limit, while more recently drumine has had claimed for it a similar action, although little or no opportunity has yet been afforded for experiment with it in Europe in consequence of the plant from which it is said to be derived being a native of Australia, and being, I believe, unobtainable in this country. Among antiseptics suitable for the surgeon may be named iodol, for which it is claimed that it has all the advantages of iodoform without its objectionable odour. This body seems to be increasing in favour, but its high price will necessarily restrict its use. Asceptol, or rather its solution, and other bodies with whose names you are familiar, have also been used to a limited extent.

Ether suitable for producing general anæthesia has probably received more attention from a chemical point of view during the last two years than had been its lot previously. Warden showed that the absolute ether of the Pharmacopœia commonly contained an impurity which liberated iodine from a solution of iodide of potassium, and finding that such samples as he examined which had this property also yielded a deposit of what appeared to be aldehyde resin when distilled from caustic potash, and then ceased to give this reaction, concluded that the impurity in question was aldehyde. This has since been shown to be a mistake, and it has been found that two impurities, one of which appears to be a product of oxidation, and the other aldehyde, may, and often do, exist independently.

Manufacturers, or some of them, while able to produce an article free from the oxidized products, maintain that it is impossible, at least on the manufacturing scale, to produce an article free from aldehyde. With regard to this contention, I may say not only that I have been able to produce an article free from both impurities myself, but that such an article can actually be obtained commercially. Whether, however, our Pharmacopœia does not make a great mistake in insisting upon such a perfect absence of water and alcohol in the unfortunately named æther purus is, to my mind, a great question, and I believe that the very low gravity required tempts manufacturers to employ powerful chemicals which produce these impurities. In this connection I may point out that in the United States, where the employment of ether for the production of anæsthesia was persisted in, when in this country chloroform was almost solely used, an article of much less low gravity has,

I believe, always been employed, the corresponding preparation of the United States Pharmacopœia only being required to have a gravity of ·725 at 15° C., equal to, say, ·724 at 60° F. Saccharin, a highly vaunted substitute for sugar as a sweetening agent in diabetes and also as a means of covering the nauseous taste of some drugs, has, owing to the lack of supply, not had much trial.

To turn for a moment to the new Pharmacopœia, I think it will be generally admitted that notwithstanding the many hostile criticisms to which it was subjected on its appearance, and the many faults which it necessarily embodies, it is upon the whole a satisfactory work, and a decided advance upon its predecessor.

The pecuniary interests of pharmacists have been affected to some slight extent by the passage of the Shop Hours' Regulation Act, which prohibits the employment of young persons under eighteen years of age for a period of more than seventy-four hours in a week. The more recent Bill of Sir John Lubbock, which has not yet become law, proposes to limit the hours during which a shop can be actually kept open, and respecting the application of this Bill to chemists, great difference of opinion has been expressed. Although not in a position myself to form a correct judgment as to how it would affect the interests of the trade at large, I cannot but think that the excessive hours of labour are exceedingly detrimental to the health and happiness of employer and employed, and that only by means of an Act of Parliament can the difficulty be got over without waiting many years. My own opinion is that the passage of Sir John Lubbock's Bill, if it included chemists, would do more in one year to improve the members of our profession in mind, body, and "status" than the Pharmacy Acts Amendment Bill will effect in ten years. I fail to see how even a curriculum can be of much benefit to those who have not leisure to keep up and add to the knowledge which they may acquire as students, by constantly reading the current literature.

The Pharmacy Acts Amendment Bill has also been a source of much discussion, in which the members of this Association have had the opportunity of joining. Whether we may agree with the principles of this Bill or not, it seems probable that it will very soon be passed. The appointment by the Pharmaceutical Conference of an Unofficial Formulary Committee is a new departure which may lead in time to very important results.

Now, gentlemen, in thanking you personally for the regular attendance of most of those whom I see here to-night, and the cordial assistance which I have received from you, I have only to regret that the number of those who attend our meetings regularly has not been greater, and to hope that should such alterations in our constitution as have been suggested be carried into effect, a marked improvement may result in the future.

The meeting was now adjourned for four weeks, for the election of President.

The adjourned meeting was held at the Royal Institution on Thursday evening, May, 26; the President, Mr. A. C. Abraham, F.C.S., in the chair; at which meeting Mr. A. H. Samuel, F.C.S., was unanimously elected President for the ensuing year. The meeting then terminated.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The annual meeting of this Association was held on Wednesday evening, May 25, at the Milton's Head Hotel, Nottingham, Mr. Councillor Fitzhugh, J.P. (President) in the chair. Among those present were Messrs. Bolton, Dennis, T. Fletcher, Gill, Holgate, Jackson, Norweb, Parker, Smith, W. Widdowson, Wilford and A. Middleton, Hon. Secretary.

The Council's annual report was presented, and showed an accession of five new members during the year. The Council lamented the loss of one of its auditors, Mr. J. Lewis, who had been a member since the foundation of the Society. The interest of the associates had been unusually well maintained, and four students had passed the Minor examination, two of them, Mr. Allen (with Mr. Dixon) and Mr. Stanley (with Mr. Bolton) having done so without any further assistance than that afforded by classes in connection with the society.

The Botanical Class has been held at the University under Professor Blake, the following being the result of the examination:—College Prize, Mr. C. Clutterbuck; Certificates, J. Stanley, F. Hemmings, H. Roberts, W. Hurd and R. Briggs.

The class on pharmacy has been conducted by Mr. W. Gill, at the rooms of the Society in Shakespeare Street, and at the examination the successful students were A. Ball, A. Eberlin, W. Hurd, H. C. Ayris and C. Clutterbuck. A donation was announced from Mr. J. H. Haywood for the Prize Fund. Arrangements have been made with Dr. Haydon White and Mr. Sargent for classes next winter on materia medica and dispensing.

The *Pharmaceutical Journal* and *British and Colonial Druggist* have been regularly received, and the Calendar of the Society is also to hand. Various interesting specimens have been received from Messrs. Hodgkinson, Stead and Treacher.

The report was adopted.

The Treasurer (Mr. W. H. Parker) presented his annual statement, which showed a balance for the year of £5 12*s.* 10*d.* After being audited it was approved.

A vote of thanks was passed to Mr. Gill for his kindness in conducting the pharmacy class.

The President proposed a vote of thanks to the retiring Secretary, which was seconded by Mr. Robert Jackson and carried.

A vote of thanks was passed to the Society and the Proprietors of the *British and Colonial Druggist* for their respective journals.

The election of officers next took place, and resulted as follows:—President, Mr. Councillor Fitzhugh, J.P.; Vice-President, Mr. W. J. Rogerson; Treasurer, Mr. W. H. Parker; Hon. Secretary, Mr. W. Widdowson.

The ballot for the Council resulted as follows:—Messrs. C. A. Bolton, J. E. Dennis, T. B. Fletcher, W. Gill, A. Middleton, A. Smith, Savage and J. Wilford.

A vote of thanks to Mr. Fitzhugh for his untiring zeal on behalf of the Society was carried with applause.

Proceedings of Societies in London.

ROYAL INSTITUTION.

The Etiology of Scarlet Fever.

A lecture was delivered on "The Etiology of Scarlet Fever" at the Royal Institution on Friday, the 27th ult., by Dr. Klein. It has been proved beyond doubt from observations reported from various sources, that epidemics of scarlet fever may either arise from the contagion spreading from person to person by actual contact or else by the inhaling of air in which germs of the disease exist. But Dr. Klein in his lecture drew attention to the character which articles of food possess as carriers of disease, and made especial reference to infection of milk both in regard to the manner in which it becomes infected, and the possible prevention of evil results arising from the sale and drinking of it and its use as food. Evidently milk may become infected in various ways, which the lecturer grouped into three divisions, citing instances of epidemics caused by the milk so infected in each case. The first division included milk contaminated directly from a human source, though not necessarily implying that the milk had been in actual contact with an infected person. Thus in April

1881, Dr. Robertson reported that in Keswick members of some thirty or forty families supplied with milk from a certain dairy had been attacked by scarlet fever, and as the cattle were completely free from disease, the milk was supposed to have been infected in its carriage from the dairy across a yard in which some children lately recovered from an attack of scarlet fever were playing. The second division included the indirect contamination of milk from a human source, an instance of which occurred recently at Oxford. On March 3 a person connected with a dairy was attacked with scarlet fever, and on that date removed to the hospital. No case of infection was observed in any family supplied with milk from the dairy until March 10, when fresh cases occurred every day until the 18th. Since the period of incubation of scarlet fever germs is always less than seven days, it follows that the persons attacked could not have had the disease communicated to them direct from the first patient. In the third division were included all those cases in which the milk had clearly not been infected by human contact, but arose from the diseased state of the cow from which it was supplied. In 1885 and 1886 considerable attention was aroused as to the cause of an epidemic in the parishes of St. Giles and St. Pancras, and other districts in the north of London. After a prolonged investigation the outbreak was associated with the delivery of milk from a certain farm at Hendon, and as, moreover, some portions only of the milk appeared to have been contaminated, the disease was traced to individual cows. Dr. Klein then gave the results of a microscopical research on the bacteria found in infected milk. The microbes in the milk were studied from various points, especially in regard to their shape, size, mode of growth in different media, and their chemical and physiological characters. In the case of the infected milk obtained from Hendon, the micrococci were of a small spherical shape, about one-twenty-thousandth of an inch in diameter, and existed either singly or budding into a double form, or, when still further advanced, in long chains. The media in which the microbes were cultivated exercised some modifying influence on the appearance of their growth, as when cultivated in broth the chains did not appear so long or pronounced, whilst when the cultivation was effected in gelatine, the chains were still further modified and the microbes seemed to aggregate more in clusters. These modes of growth were made very apparent by the lecturer in a series of microscopical slides projected upon a screen. Further observations as to the growth of the microbes were made in tubes containing a quantity of "nutrient gelatine" composed of broth and gelatine. This mixture was inoculated by drawing over the surface of the gelatine the point of a needle previously dipped in the infected milk. On either side of its track small colonies of the microbes sprang up, and it was remarked of their growth that there was always an appreciable centre to each colony, whilst the colonies never became confluent, but their divisions always remained very distinct. Even when the microbes were spread thickly on the surface of the gelatine, or the gelatine was stabbed with the needle, the colonies of microbes always retained their isolated appearance. Among a number of specimens, however, Dr. Klein called attention to one tube of gelatine which had been inoculated about fourteen or fifteen months, in which the original colonies appeared to have sprouted and produced small ramifications. Dr. Klein then explained that having thus established certain facts in regard to the character of the microbes in infected milk, he inoculated calves with a cultivated liquid containing these microbes, upon which the calves were attacked with the same disease apparent in the cows from which the original milk had been obtained, whilst microbes of the same character could be recovered from the blood and tissues of the calves. A connection was thus proved to exist between these particular microbes and this particular disease and in order to complete the chain of evidence it was now necessary to discover if the same microbes existed in the blood and tissues of human patients suffering from scarlet fever. This was found to be the case, the microbes obtained being alike in microscopical and cultural characters, and Dr. Klein exhibited a microscopical section of the liver of a victim from scarlet fever, and also a cultivation of microbes from the same, in both of which the organisms seen in the infected milk were observed, and for which Dr. Klein has proposed the name of *Micrococcus scarlatinæ*. The lecturer now referred to a point still more interesting, if not alarming in its nature. In October, 1886, he had occasion to examine several tins of a particular brand of condensed milk which had been suspected of communicating scarlet fever to persons partaking of it. In one of the three tins examined he found the presence of microbes in all respects identical with the *M. scarlatinæ*, and capable of communicating the disease to mice and calves inoculated with it. Dr. Klein considered that the milk, which was presumably cows' milk, sold as a cheap brand to the poorer classes, had been very slightly heated, as in all the tins examined he detected the presence of various organisms, and in one case a species of bacillus was observed. With regard to the question as to whether the milk coming from a diseased cow was infected *per se*, or whether the infection arose from contamination with matter from ulcers in the udders, the lecturer considered both explanations as probable. The means taken for the prevention of this and other contagious diseases was also referred to by the lecturer. He remarked that mere infection of the milk by human contact could be avoided by attendance to the sanitary laws maintained in all good dairies, but when the disease existed amongst the cows, the case was much more difficult. The suspected cows, however, should be isolated, and Dr. Klein here mentioned that, in his opinion, veterinary practitioners had not kept abreast of medical men in this research, and did not attach sufficient importance to the matter, because milk of cows infected with cutaneous diseases had not given rise to scarlet fever in certain cases. Dr. Klein thought it rather remained with them to find out under what conditions contagion is effected. In conclusion the lecturer mentioned that if milk be heated to 185° F. for five minutes all the *M. scarlatinæ* are destroyed and gelatine inoculated with milk so heated remains sterile. As an instance of the efficacy of this treatment, Dr. Klein referred to the Keswick epidemic previously mentioned, in which a lodger drinking raw milk was attacked with scarlet fever, whilst the landlady, who had previously heated the milk drunk by herself, was not attacked. Indeed, Dr. Klein considers that if the treatment were applied in every case, seventy per cent. of the cases of scarlet fever would not be incurred, the remaining cases being due to personal infection and the consumption of cream from infected milk.

The Application of Photography to Astronomy.

On Friday, the 3rd inst., Mr. David Gill, Her Majesty's Astronomer at the Cape, delivered a lecture at the Royal Institution on "The Application of Photography to Astronomy," in which was incorporated a *résumé* of the decisions arrived at by the recent International Astronomical Congress held in Paris. The lecturer commenced by throwing upon a screen a photograph of the comet of 1882, as observed by himself at the Cape. The comet had a tail of about twenty degrees in length, and projecting in an opposition direction to the tail a small ray of light was observable in the photograph, though this was stated not to have been visible to the naked eye. The object of the lecturer in showing the photograph was, however, to exhibit the result obtainable without any of the modern appliances in astronomical photography, which had not then been at his disposal. In this case an ordinary photographic apparatus was used, to which was attached a telescope of

2-inch lens and 11 inches focal length as a guide to follow the nucleus of the comet, and the plate was submitted to two hours' exposure. Whilst Mr. Gill did not claim any novelty in the experiment or *modus operandi*, yet his photograph was a creditable one as compared with those now obtained with rapid drying plates with large field and properly adjusted guiding telescopes, the sole drawback consisting in the oval appearance of the stars, owing to the movement of the photographic plate. Some photographs of the modern telescopes and photographic apparatus used in observatories at the present time were then projected on the screen, and Mr. Gill pointed out the automatic clockwork arrangements for causing the photographing apparatus to revolve with the star or planet under observation, whilst in order to correct any slight error, an observer was stationed behind the guiding telescope to keep the two fine wires in the field of the telescope bisecting a particular star. Mr. Gill then drew attention to the work commenced by the brothers Henry, of Paris, in 1871, of charting all the stars as far as the ecliptic, and the difficulty of procedure when they reached the milky way, which was largely overcome by the opportune introduction of dry photographic plates. Then followed a glowing eulogy of these two astronomers, during which the lecturer described a recent visit he had paid to their observatory, in which every lens and instrument had been made by themselves without assistance. Mr. Gill next reverted to the objects proposed to be accomplished by the recent Congress, and he stated that he was induced to bring this subject forward because there was a popular idea that the only project to be attempted was to take a number of photographs of all parts of the stellar world in order to be able to compare them with like photographs taken in fifty or one hundred years' time. In brief, however, it has been determined to make a photographic chart of stars for this epoch and to compute the position and magnitude of all stars to the fourteenth magnitude. It had been seriously proposed to include stars of even the sixteenth or seventeenth magnitude, but as the present project included some twenty millions of stars it was thought better not to attempt too much. Further, it has been resolved to prepare a catalogue of all stars up to the eleventh magnitude, which will include about one-and-a-half million. This will of course involve an immense amount of labour as, owing to certain difficulties, measurements on the photographic charts cannot be at present used to determine the absolute position of the stars, and resort will have to be made to the old-fashioned meridian observation. Not the least of the difficulties to be overcome with regard to the photographic plates is the contraction of the film in course of development. With regard to these works Mr. Gill considered that although the data furnished with regard to the distribution of stars of the higher orders of magnitude, yet by far the most useful work to the coming generation will be the catalogue. The taking of so many observations will involve an immense amount of skilled routine work of a very trying character, which it would be useless for an amateur or a single handed astronomer to attempt, so that the erection of Government establishments for the purpose in each country is almost absolutely required. The French Government has already sanctioned expenditure for the erection of four telescopes. The lecturer then referred to the attempts of modern astronomers to heighten the precision in celestial photography, as on this will depend an advance in the method of measuring distance in inter-stellar space. This was followed by an exhibition of a series of photographs of planets and their satellites, double stars, clusters, sun spots, etc., among which were several showing the varying position of the black spot on Jupiter, by means of which its rate of rotation can be measured. The lecturer closed with a brief sketch of the work done by Professor Pickering in connection with the Henry Draper Memorial Fund.

SOCIETY OF CHEMICAL INDUSTRY.

A meeting of the Society of Chemical Industry was held in the rooms of the Chemical Society on Monday, the 6th inst., Mr. David Howard being in the chair.

A paper was read by Dr. H. E. Armstrong on

The Alkaloids—the Present State of Knowledge concerning them, and the Method employed in their Investigation.

BY H. E. ARMSTRONG, PH.D., F.R.S.

The author in his opening remarks called attention to the fact that although nitrogen is commonly regarded as one of the most inert of the elements, yet generally the presence of nitrogen in a body is associated with great activity; further, he remarked that in formulating nitrogen compounds, he did not agree with the practice of regarding nitrogen as always existing either as a triad or pentad. Referring to the researches of M. Pasteur on the presence of micro-organisms in zymotic diseases, and the subsequent proofs that the effects of such diseases are due not to the presence of organisms themselves, but to the toxic properties of the alkaloids produced by them, Dr. Armstrong pointed out that this study had drifted very largely into the hands of morphologists, and that a large field was open to chemists for research in this direction, and also in the preparation of antidotes to the effects of these alkaloids. The alkaloids which first received attention in the paper, are a group of four which Dr. Armstrong termed the "trimethylamine alkaloids," owing to their composition. They consist of neurine, choline, muscarine and betaine, and their composition in each case includes the trimethyl group, associated respectively with amylic alcohol, glycol, hydrate of hydroxyaldehyde, and hydroxyacetic acid. Of these both neurine and choline, which only differ by the molecule H_2O, exist ready formed in the animal organism, whilst both muscarine and betaine can be formed from choline by oxidation. Muscarine, neurine and choline have the same physiological characters, muscarine, as might be expected from its composition as an aldehyde, being the most active and decidedly poisonous, whilst the other two partake in their respective order of the same characteristics in a modified form. From the alkaloids found to occur naturally in the animal system and those nearly allied in composition, Dr. Armstrong passed on to the series of alkaloids found to be present in putrid flesh, and which Selmi has designated "ptomaines." Associated with researches on these bodies the names of several Italian chemists appear. Selmi was one of the first to attack the subject, and succeeded in bringing forward several qualitative tests for their presence, but Dr. Armstrong especially designated Brieger as affording valuable information concerning the separation and characteristics of these bodies. It is noticeable that ptomaines are only formed during the early stages of putrefaction of albuminoids, and that if the putrefaction be allowed to proceed for eight or ten days these bodies disappear and are replaced by other bodies of a benzinoid nature. Horseflesh has been found to give the largest proportion of these ptomaines, the method of preparation being the digestion of finely-chopped meat in water. Brieger thus obtained a non-poisonous body called neuridine, with the formula $C_5H_{14}N_2$, the hydrochlorate of which is easily crystallizable, and resembles urea in appearance. Together with this he also obtained a poisonous base of the composition $C_5H_{11}N$. From the putrefaction of fish ethylenediamine has been obtained, together with a base of the formula $C_7H_{16}NO_2$ and trimethylamine. From cheese putrefaction neuridine and trimethylamine were obtained, whilst in the products from the putrefaction of yeast only trimethylamine has been separated. In the putrefaction of human flesh, choline and neuridine first appear, but on a longer exposure they both disappear, and this disappearance is followed by the formation of three new bases, all of which are non-poisonous diamines, cadaverine ($C_5H_{14}N_2$) which is a pentamethylene diamine, pu-

trescine ($C_4H_{12}N_2$), and saprine ($C_5H_{16}N_2$); together with these two other bases possessing toxic properties have been observed. In all the experiments previously mentioned, a free access of air was allowed, but in another experiment by Brieger a large quantity of flesh was allowed to putrefy in a stable-loft from October to January with little or no access of air. A few ptomaines were formed, but of a less poisonous character. Among the latest researches of the same chemist Dr. Armstrong alluded to the isolation of tetanine, $C_{13}H_{30}N_2O_4$, the product of the micro-organism observed in tetanus. A hypodermic injection of tetanine produces all the symptoms observed in cases of tetanus, thus affording another proof that bacteria cause the suffering in their peculiar diseases by their products. Dr. Armstrong now referred to the "pyridine alkaloids," and gave a short *résumé* of the subject from the discovery of chinoline in 1842 until the period of Skraup's researches. By means of graphic formulas he also showed that the relation between pyridine and benzene was the same as the relation between chinoline and and naphthalene, one of the CH groups being replaced in each case by an atom of nitrogen. After describing the composition of allyl-aniline and the work of Prud'homme, Brüning and Graebe in the production of dye stuffs, Dr. Armstrong passed on to the consideration of some of the pyridine bases existing in plants. Pepper contains a base, piperine, which on boiling with caustic potash is resolved into piperidine and piperic acid. Piperidine $C_5H_{11}N$ can be obtained from pyridine C_5H_5N by the reducing action of tin and hydrochloric acid, whilst it is also obtained together with pentamethylene-diamine by the action of nascent hydrogen on trimethylene cyanide. Coniine, the alkaloid contained in hemlock, was discovered in 1827, and up till 1851 was considered to have the formula $C_8H_{15}N$, but now this has been shown by Hofmann to be $C_8H_{17}N$. By the oxidation of conyrine, $C_8H_{11}N$, of which coniine is a hexhydride, a product of pyridine was obtained, pyridine-carboxylic acid, from which it was deduced that conyrine is a propyl or isopropyl pyridine, and since isopropyl pyridine was obtained from propyl-iodide of pyridine, and the hexhydride of this gave a body with some slight differences from coniine, coniine was therefore assumed to contain the propyl radicle. Ladenburg, however, in a research on coal-tar picoline, obtained a product, α-picoline, from which allyl-pyridine was obtained. On heating this with nascent hydrogen the product answered to all the characteristics of coniine with the exception that it was optically inactive. By treating it with dextro-tartaric acid and crystallizing, a first crop of crystals was obtained that were dextro-rotatory, the rotation being practically the same as that of coniine. In the mother liquors a base was found that was slightly lævo-rotatory, which corresponded with the product afterwards obtained by the treatment of coniine with cadmium iodide. The cinchona alkaloids have also afforded a large field for research owing to their complicated composition. In the oxidation of cinchonine, cinchonic acid ($C_{10}H_7NO_3$) is obtained, having the composition of chinoline-carboxylic acid; on further oxidation with permanganate of potash, pyridine-tricarboxylic acid results, from which pyridine can be separated. Quininic acid ($C_{11}H_9NO_3$) results as the oxidation of quinine and xantho-quininic acid can be split up into hydroxychinoline and carbon dioxide. Besides cinchonic and quininic acids other acids are produced by the oxidation of the respective alkaloids, but their composition has not yet been determined, although Skraup recently stated that he has succeeded in isolating them. The results of such researches prove, however, the presence of the pyridine or chinoline groups in cinchona and other alkaloids. In the opium alkaloids pyridine is associated with a non-nitrogenous group, as may be seen from the oxidation products of narcotine ($C_{12}H_{13}NO_3$), which consist of opianic acid ($C_{10}H_{10}O_5$), hemipinic acid, meconin and cotarnine. A relation also exists between morphine and codeine, the latter of which is a methyl derivative of the former. In conclusion Dr. Armstrong called attention to the vast amount of work accomplished in the synthetical formation of antipyretics, and remarked more especially on the methylated products, which do not have disagreeable secondary effects, as is the case with many of the non-methylated ones. He expressed his regret that up to the present time English chemists had generally confined themselves to analytical problems, whilst continental chemists had acquired great superiority from attacking problems from the synthetical side.

In a short discussion which followed the reading of the paper Mr. David Howard remarked that he thought the position of the English chemists in regard to synthetical work was considerably due to English legislation with regard to vivisection, which precluded them from studying the physiological activity of any new bodies they might isolate. At the same time he expressed his surprise at the prevailing ignorance among English chemists respecting synthetical work, even in the case of one who recently claimed to have effected the synthesis of quinine. His remarks on the restraint laid upon physiological study were endorsed by several speakers; one suggested that there was also a moral side to the question, but was overruled by the remark of the Chairman, that he thought such researches having for their object the diminution of human suffering fully justified.

Dr. Alder Wright drew attention to the wide differences exerted in the physiological effects of many bases even by such a slight alteration in their composition, as the extraction of a molecule of H_2O, a fact which he should never lose sight of owing to his sufferings caused by the unsuspected production of apomorphine whilst at work.

Dr. Stevenson appeared to throw some doubt on the formula assigned by Brieger to the ptomaines first isolated by him, as the last discovered and most active body, tetanine, had a more complex structure.

Owing to the lateness of the hour a paper by Mr. B. Redwood, on "A Visit to the Petroleum-Producing Territories of the United States and Canada" was accepted as read, and will be published in the Journal of the Society in due course. The next annual meeting of the Society was announced to be held on July 13, 14 and 15 at Manchester.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The first meeting of the new Council was held on June 2, at which the following principal officers were elected to serve for the coming session:—President, Mr. T. S. Dymond; Vice-Presidents, Messrs. J. E. Saul and A. J. Phillips; Honorary Treasurer, Mr. W. R. Dodd, F.C.S.; Honorary Secretaries, Messrs. E. J. Millard and E. S. Taylor. The President, Vice-Presidents, Treasurer, and Messrs. Bird and Millhouse were appointed on the Publication of the Proceedings Committee.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, June 2, Mr. J. J. Thomas being in the chair.

Mr. E. Young read a paper on "Turpentine and other Terpenes," in which he first described the methods employed for collecting the oleo-resin and distilling off the oil from it, briefly alluding to gum thus and other matters connected with this part of the subject. The sources of the different varieties were then given, and their principal differences explained; their specific gravities, boiling points, and specific rotations of polarized light being tabulated. The preparation and properties of terebene were described, and the composition of its constituents explained; other derivatives of terpenes, such as the hydrochlorates, bromides, cymene, terpin hydrate, etc., were discussed, and the probable composition of terpene inferred from these; its relation to camphors, resins, etc.,

also received notice. The various other terpenes and citrenes were also compared with oil of turpentine.

The paper gave rise to a discussion in which the Chairman, Secretary, Miss Munro, Messrs. Eastes and Tingle took part.

The second report of the session on Analytical Chemistry was then made by Mr. J. G. Tingle. This dealt with (1) the detection of alkaline carbonates in the presence of bicarbonates by rosolic acid, and preferably by phenolphthalein; (2) an improvement in the glucose test consisting in the facilitation of the precipitation of the Cu_2O by the addition of 3 to 5 drops of a 15 per cent. solution of $CaCl_2$; (3) a method of estimating KI by titrating it with an acid normal solution of $NaIO_3$, and dependent upon the well-known reaction of iodides and iodates in the presence of an acid, iodine being liberated; (4) a modification of the copper electrolytic test for Hg, adapted for detecting the salts of that metal in urine; (5) two new methods for the detection of cotton-seed oil in olive oil; (6) two modifications of the thalleioquin reaction for quinine, designed with a view of dispensing with the use of chlorine water, by substituting a solution of the gases produced by the action of HCl and H_2SO_4 on $KClO_3$; (7) reactions for kairin, antipyrin, and antifebrin, with solution of Fe_2Cl_6; and (8) a new test for thymol, dependent on the formation of a violet residue, when a chloroformic extraction of a KHO solution of the stearoptene is evaporated in a porcelain capsule. The report was illustrated in parts with experimental demonstrations of the tests mentioned, and was followed by considerable discussion, chiefly concerning that portion of the paper which referred to the olive oil tests. The customary vote of thanks having been tendered, a little miscellaneous business was discussed, and the proceedings terminated.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, June 2. Mr. William Crookes, F.R.S., President, in the chair.

The President announced that the Council had resolved to present an Address of Congratulation to the Queen.

The following papers were read :—

The Equivalent of Zinc. By Lieut.-Colonel Reynolds, late R.E., and Professor W. Ramsay.—The determination has been made by measuring the hydrogen evolved on dissolving zinc in acid, every precaution being taken to ensure accuracy; the weight of the hydrogen obtained was deduced from Regnault's determination of the density of hydrogen. The zinc used was separated by electrolysis from zinc sulphate, purified to the utmost possible extent; the last sample prepared was so nearly pure that dilute acid would scarcely act on it. In all, 29 experiments were made. Four experiments had to be rejected; nine were not fully corrected and therefore were also rejected; the next 11 were considered preliminary, the mean atomic weight deduced from them being 65·2430; finally, five experiments were completed, and the following results obtained from these are free from all known sources of error :—

	65·5060
	65·4766
	65·4450
	65·5522
	65·4141
Mean	65·4787 ± 0·016135

The Magnetic Rotation produced by Chloral, Chloral Hydrate and Hydrated Aldehyde. By W. H. Perkin, Ph.D., F.R.S.—The author has shown in a previous paper (*Chem. Soc. Trans.*, 1886, 777) that when water unites with another substance so as to produce an atomic and not a molecular compound the magnetic rotatory power of the product is less than the sum of the magnetic rotatory powers of the compounds used in its formation. He has now applied the same method of examination to aldehyde and chloral and their hydrates. Chloral hydrate was examined (*a*) in the fused state at 55·5°; and at the ordinary temperature (*b*) dissolved in water in the proportion of 1 mol. to 3 mols. of water, and (*c*) dissolved in a new neutral liquid isoamyl oxide. Deducting from the values found that deduced for liquid chloral, the results are as follows :—

	Fused at 55·5°	In water.	In amyl oxide.
Chloral hydrate . .	7·173	7·016	7·028
Chloral	6·590	6·590	6·590
	0·583	0·426	0·438

From these numbers it is evident that chloral hydrate does not contain water as a constituent, as in that case the difference should be 1·00. As ethylidene glycol, $CH_3{\cdot}CH(OH)_2$, is not known, at any rate in a pure state, its magnetic rotatory power was deduced from that of some of its derivatives (*Chem. Soc. Trans.*, 1884, 571). Deducting from the most probable value (2·817) that of aldehyde (2·385), a difference results (0·432) which is practically identical with those found in the case of chloral hydrate at low temperatures. The result obtained with fused chloral hydrate at 55·5° is a little higher, but there is no doubt that the hydrate is slightly dissociated when heated to this temperature: that this is the case is further indicated by a series of determinations of the density of a solution of chloral hydrate in amyl oxide between 4° and 60°, a change in the curve obtained on plotting the results being seen to occur at a point corresponding to a temperature a good deal below 55·5°. Experiments were also made with mixtures of aldehyde and water, that generally used consisting of equimolecular proportions. On making this mixture of aldehyde and water, some interesting peculiarities were noticed. If the temperature of the air and of the liquids be about 8° or 9°, at the moment of mixing the temperature drops about 1·5°; it then commences to rise somewhat quickly, and continues to rise, but more and more slowly, for a long time; in one experiment, made in a large test-tube covered with cotton-wool, commencing at 9° the temperature rose to 18·7° but only in the course of twenty-five minutes. If the temperature of the substances before admixture be about 16° and the quantities not too small, the rise of temperature is more rapid, and the mixture enters into ebullition. On attempting to determine the density of the mixture of aldehyde and water the results obtained were at first very perplexing from the fact that concordant numbers could not be obtained. It was then found that when any change of temperature took place the volume did not become constant in less than two and a half to three hours, so that in determining the density it was necessary to keep the tube containing the mixture at the desired temperature for two and a half hours before adjusting. Part of the product evidently undergoes dissociation as the temperature rises, recombination taking place as the temperature falls, but only very gradually, a small variation of temperature sufficing to produce a disturbance. Comparing the magnetic rotatory power of aldehyde with that of the mixture with water at 16°, the difference $0{\cdot}929 = 3{\cdot}324 - 2{\cdot}385$ is less than 1·00, and it may therefore be concluded that combination takes place; at a lower temperature no doubt this combination would have been found to be more perfect. There can, however, be no doubt that ethylidene glycol is present in the mixture. Glycols are viscid fluids, and it is interesting to notice that when the hydrated aldehyde is shaken up, a froth forms which does not break at once, the mixture differing in this respect from aldehyde and also from water. The effect of mixing aldehyde and absolute alcohol in molecular proportions is also very interesting. If the temperature of the liquids be not too low, the temperature rapidly rises and the mixture boils; if however the temperature be low, say 8° or 10°, the temperature im-

mediately falls seven or more degrees : the rise then sets in, and before long the mixture reaches its boiling point. In the first instance the fall is due to what may be called molecular arrangement setting in between the two fluids, which is a physical change, and occurs before chemical action has had time to take place to any appreciable extent ; then chemical action takes place more and more rapidly, and in consequence the temperature rises. On mixing pure dry ether with aldehyde a fall of temperature occurs; subsequently the temperature rises gradually, but only to that of the surrounding air.

Note on a New Class of Voltaic Combinations in which Oxidizable Metals are replaced by Alterable Solutions. By C. R. Alder Wright and C. Thompson.—It appeared to the authors probable that just as a liquid capable of parting with oxygen, chlorine, etc., can be used in conjunction with an electrode of unchangeable material at one side of a voltaic cell (as in Grove's nitric acid battery and analogous combinations), or may be replaced by a solid conducting electrode, itself capable of losing oxygen (*e.g.*, a plate of strongly compressed peroxide of lead), so conversely might a conducting plate of oxidizable material (*e.g.*, zinc) at the other side be replaced by an unchangeable electrode in conjunction with a liquid capable of taking up oxygen, chlorine, etc., without producing any fundamental change in the character of the actions taking place in the cell whilst generating a current. The electrode immersed in this oxidizable substance, like the zinc of an ordinary cell, would acquire the lower potential, and the opposed plate the higher potential ; *i.e.*, the wire connected with the latter would be the "positive pole" of the construction in reference to the external circuit. On trial, it has been found that such is the case, and that in consequence a large variety of novel forms of cell becomes easy of construction. For example, sodium sulphite or potassium ferrocyanide solution opposed to chromic-sulphuric acid solution ; preferably with an intermediate layer of some neutral salt solution, such as sodium sulphate, to prevent the direct action of the two fluids on one another. During the passage of a current sodium sulphate or potassium ferricyanide is formed in quantity proportionate to the electricity passing, *i.e.*, to the amount of silver thrown down in a silver voltameter included in the circuit ; whilst chromium sulphate is produced at the other side. Various analogous cells are described, in particular one where lead oxide dissolved in caustic soda is opposed to alkaline hypobromite: in this case lead dioxide is produced and separates out in the solid form ; and one where chromium sesquioxide dissolved in caustic soda is opposed to chromium trioxide dissolved in sulphuric acid ; here sodium chromate and chromium sulphate are formed, an E.M.F. about equal to that of a Daniel cell being set up.

Mr. Page said that after listening to Dr. Wright he was able for the first time to understand how electric currents might arise in the animal body.

Dr. Alder Wright said, in reply to Mr. Page, that the experiment suggested of opposing venous and arterial blood had not been actually tried by him as yet, but he thought it quite probable that a weak current might be produced (the President subsequently said that he had been told—he believed by Mr. Peter Squire—that a current was produced on opposing venous and arterial blood). By opposing alkaline pyrogallol solution to oxidizing agents, notable currents could be developed ; and various other organic compounds might be used instead of pyrogallol. With certain organic bodies, however (*e.g.*, chloral hydrate), attempts to produce oxidation in cells had hitherto failed. The opposition of acid and alkaline fluids alone would not necessarily produce more than infinitesimal currents ; Becquerel's "*pile à oxygène*" (nitric acid opposed to caustic potash solution) gave rise to decomposition of nitric acid and evolution of oxygen from the electrode immersed in the alkali ; other authors have found that analogous cells with chromic-sulphuric acid instead of nitric acid would behave in the same way and develop a continuous current capable of doing external electrolytic work, such as deposition of silver in a voltameter; on the other hand, a cell in which caustic soda and sulphuric acid only were opposed (so that chemical action other than neutralization could not take place) would only develop an infinitesimal current through a silver voltameter, capable of depositing traces of silver even after some days, although its E.M.F. measured by an electrometer was considerable. With regard to the observations of Dr. Armstrong, he would say that whilst without doubt Grove's gas battery was the prototype of the class of cells discussed, inasmuch as that combination was virtually an oxidizable solution of hydrogen opposed to an oxidizing solution of free oxygen, still the examination of cells in which other oxidizable fluids were used instead of hydrogen solution, and other oxidizing substances besides solution of oxygen, was a branch of experiment in which hardly anything had hitherto been done, and which seemed to merit some little attention. The authors desired to study in detail the general behaviour of certain typical classes of cells in which actions of the kind take place, especially from the point of view of elucidating the precise chemical changes going on, and their relations to the amounts of electrical (or current) energy developed. Whilst there was not exactly a probability of any very startling discovery being made, there were still a number of points of interest connected with the subject worth examining ; and although the hope of an improved primary battery based on actions of this kind for commercial use, as suggested by the President, was perhaps not yet within measurable distance, yet the problem of economically obtaining current energy by direct chemical action (and especially by oxidation) was one now attracting considerable attention, and it was impossible to predict what might or might not be the result of systematic experiments tending in that direction. The importance of obtaining practically usable currents from coal direct without the use of the steam engine and dynamo could hardly be over-rated should it hereafter be found practicable so to do; and in view of the compactness of the animal machinery, whereby the oxidation of fuel in the form of food gave rise by muscular action to mechanical energy, it did not seem to be of necessity hopeless to attempt to solve such a problem.

The Composition of Prussian Blue and Turnbull's Blue. By Edgar F. Reynolds.—According to Williamson, these compounds are respectively represented by the formulæ Fe_7Cy_{18} and Fe_5Cy_{12}, but Reindel and others have conjectured that they are identical in composition. The author has carefully prepared Prussian blue from hydrogen ferrocyanide and ferric chloride, and Turnbull's blue from hydrogen ferricyanide and ferrous sulphate; his analyses of the products show that Williamson's formulæ are correct expressions of their composition.

Phlorizin. By Professor E. H. Rennie, D.Sc.—The author has endeavoured by a re-examination of phlorizin to decide as to the correctness or otherwise of the usual formula, and also to ascertain whether the sugar yielded by it on hydrolysis is really dextrose or not. He shows by analyses and by a quantitative examination of the decomposition by dilute sulphuric acid that the usually accepted formula and equation correctly describe the composition and hydroliysis of phlorizin. The sugar obtained from it melted at 85—86° ; its molecular rotatory power was $[\alpha]_D = 57{\cdot}9°$; and it gave with phenylhydrazine hydrochloride a yellow crystalline precipitate melting at 204—205° ; there can be little doubt, therefore, that it is ordinary dextrose.

Further Notes on the Chemical Action of Bacterium Aceti. By Adrian J. Brown.—The author has continued his studies on the oxidizing actions of *B. Aceti*, and states that although mannitol has been shown to be easily converted into lævulose by the organism, its isomeride, dulcitol, is not acted upon. The dihydric alcohol, glycol,

is oxidized into glycollic acid, no other product being formed. The action is carried on much further when calcic carbonate is present to neutralize the acid as it is formed. The trihydric alcohol, glycerol, is found to be completely decomposed into carbon dioxide and water, the only other product formed being a very small amount of an acid, the identity of which could not be determined. Glycerol appears to encourage the growth of *B. Aceti* more than any other substance with which the author has experimented. The tetrahydric alcohol, erythrol, resists the action of the organism. Attention is called to the fact that erythrol and methylic alcohol are both acted on by oxygen in presence of platinum-black, but escape oxidation when placed under the influence of *B. Aceti*; it is also shown that when the same substance is submitted to oxidation in the two ways, the products are generally dissimilar, as in the cases of mannitol and dextrose. It is therefore considered that although the products of the actions which occur in presence of both platinum-black and *B. Aceti* are similar in the case of ethylic alcohol, the manner in which the oxidation is effected, contrary to the usual idea, is probably quite different. Mannitol has been prepared by the author from pure dextrose by the action of sodium amalgam. On submitting this to the action of *B. Aceti* it was converted into lævulose, thus completing the conversion of dextrose in into lævulose. As the melting point and crystalline form of mannitol from dextrose are similar to those of mannitol from manna, there can be little doubt that the two mannitols are identical.

Note on the Cellulose formed by Bacterium xylinum. By Adrian J. Brown.—The author showed in a previous paper (*Chem. Soc. Trans.*, 1886, 432), that an acetic ferment, *B. xylinum*, is able to convert lævulose into cellulose. On treating this cellulose with strong sulphuric acid, it is found to be converted into a dextrorotary sugar and in this respect to resemble ordinary cellulose.

The Oxidation of Ethyl Alcohol in the Presence of Turpentine. By C. E. Steedman, Williamsburn, Victoria.—The author finds that dilute ethyl alcohol in the presence of air and turpentine becomes oxidized to acetic acid. The experiment was made by placing in a clear glass 16-oz. bottle a mixture of 2 drachms of alcohol, 1 drachm of turpentine, and 1 oz. of water; the bottle was securely corked and left exposed to a varying temperature averaging about 80° F. for three months; at the end of that time the liquid was strongly acid from the presence of acetic acid. One curious fact appears to have light thrown upon it by this observation. Mr. McAlpine, Professor of Biology at Ormond College, Melbourne University, has a method of preserving biological specimens by abstracting their moisture with alcohol after hardening in chromic acid, and then placing the specimen in turpentine for some time, great discrepancies arise, however, according as the alcohol is allowed or not to evaporate from the specimen before dipping it into turpentine.

Obituary.

GEORGE CHRISTOPH WITTSTEIN.

The death is announced of Professor Wittstein, which took place at Munich on the 2nd inst. The deceased was born in 1810, in Hanover, where he studied pharmacy. After passing his qualifying examinations he became a teacher of chemistry and natural science, and laboured in this field for many years at Munich. A work on Practical Pharmaceutical Chemistry, by Professor Wittstein, was translated into English by Mr. S. Darby in 1853, and another on the Organic Constituents of Plants, more recently, by Baron v. Müller. The 'Vierteljahrschrift für praktische Pharmacie' was established by Professor Wittstein in 1852 and edited by him during the twenty-one years of its existence, and he was also the author of numerous articles on food analysis.

Notice has also been received of the death of the following:—

On the 28th of May, Mr. Thomas Ruston, Chemist and Druggist, late of Aspatria, near Carlisle. Aged 77

On the 1st of June, Mr. Henry Vaughan Telfer, Chemist and Druggist, Bruton, Somersetshire. Aged 45.

On the 2nd of June, Mr. John Borwell Johnson, Pharmaceutical Chemist, Uttoxeter. Mr. Johnson had been a Member of the Pharmaceutical Society since 1853, and for many years had filled the office of Local Secretary.

On the 5th of June, Mr. Frederick William W. Lloyd, Chemist and Druggist, Eastbourne. Aged 37 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Unfair Competition.

Sir,—Under this title one more would-be monopolist adds his feeble wail to the already great outcry for protection in trade. Surely your precepts, clearly and carefully explained though they ever are, fail woefully to carry conviction to many doubting minds. Perhaps it is a case of repetition of the old story "a man convinced against his will," etc. Be that as it may, the idea that the sale of some few poundsworth of poisons by legally unqualified persons is at the root of all or most of the present evils druggists suffer under, seems to hold its ground most tenaciously. Such idea, at all events, appears to influence your correspondent when he urges that the example set by the Brighton pharmacists should be "promptly and enthusiastically followed." But is this "idea" of sufficient importance to call for "protective" legislation? Is there any real ground for attempting to limit the choice of the public as to where it will purchase its drugs?

Has the average druggist fitted himself intellectually to such a degree as to entitle him to look for the exclusive right to retail or dispense any articles used in medicine? I ween not. A scrambling apprenticeship and a three months' course of "cram" are not conducive to high culture, and a certificate obtained more or less by mere luck is certainly no evidence of the same. Yet how much more training do many receive? Is it not notorious that much that should be taught during pupil-age is left to be picked up anyhow and, often, after taking a position as assistant, if perchance it be not ground up under the practised tuition of an "irregular" teacher during the aforesaid three months? How, then, can we look for increased confidence by the public in our abilities, or for freedom from competition? Should we not rather try to perceive that this same "competition" is necessary under the circumstances, and really healthful, inasmuch as it raises the standard of excellence of our commodities, compelling all who would be of the "fittest" who survive to pay attention to the quality of all they sell, and to aim at dealing fairly and honestly with their customers?

Do let us endeavour to deserve all we would receive, and not pose as mendicants whining for favours.

Let apprentices be thoroughly taught, that they may attain skill in their art; give them opportunities of studying the necessary sciences; then, fully equipped, send them to meet the examiners and receive the official stamp of proficiency. So by degrees, slowly may be, yet surely, our status will be elevated, public opinion will turn in our favour, and we shall find the reward of our labours. But the idea of "protection in trade" must yield place to the advancement of the profession. Else we may expect to stick in the old grooves, and rightly so.

Sheffield. John Humphrey.

Chloral Hydrate and Fehling's Solution.

Sir,—In the last paragraph of Mr. J. J. Thomas's very creditable paper on butyl-chloral, printed on p. 986, I notice a statement which calls for some comment. The writer observes that the "reduction of Fehling's solution by chloral hydrate is no doubt due to the formate produced by the alkali," and upon this assumption founds an opinion and an equation. From the tone of the remainder of the paragraph referred to, it would appear that Mr. Thomas had not confirmed his opinion by experiment.

Recently I had occasion to call attention to the action of Fehling's solution on chloral hydrate (see before, p. 856), and I then ascribed the decomposition to the chloroform produced. The matter at the time had only incidental interest, but before hazarding this statement I had taken the precaution to examine the behaviour of an alkali formate with Fehling's solution. I found that there was absolutely no reduction of the copper, even after boiling for some time, nor did the use of Trommer's, Pavy's, Schmiedeberg's, Cresswell's or Holland's modifications of the cupric test result in a different experience. I therefore unhesitatingly ascribed the decomposition only to the chloroform produced, the fact being well known that this body readily reduces an alkaline cupric solution. The non-reduction of copper by butyl-chloral tends to confirm my statement, as no chloroform is formed on treating with caustic alkali. Curiously enough, Hoffman and Power, in their standard work on the examination of medicinal chemicals, ascribe the rapid reduction of copper by chloroform to the formation of a minute trace of sodic formate. This opinion they probably base on the fact that chloroform when superheated with aqueous or alcoholic potash is split up, forming potassic formate and chloride. On the other hand, chloroform can be distilled unchanged from aqueous potash. If, therefore, any formate is produced at the temperature employed, the rapidity and amount of the copper reduction would tend to negative the idea of its exercising any function whatsoever in the reaction, even intermediate or catalytic.

An interesting point in connection with the medicinal exhibition of butyl-chloral may be noticed. Ethyl-chloral hydrate during its passage through the system appears to combine with some product of the organism forming the conjugate body, *urochloralic acid*. This, like its progenitor, reduces Fehling's solution. Butyl-chloral hydrate, as we know, does not react with Fehling, and yet, if Mering and Musculus, the discoverers of urochloralic acid, are to be credited, the urine of persons under treatment with butyl-chloral reduces the cupric solution. I have not had the opportunity of examining such a urine; but it would be manifestly interesting physiologically if the statement of these chemists could be confirmed.

143, *New Bond Street.* J. E. Saul.

Huechys Sanguinea.

Sir,—Mr. Moss has kindly sent me a sample of *H. sanguinea*, and I have no doubt from the appearance of the insects, and the results of his careful experiments, that they are not the same as my specimens brought home in 1871, and described by me, at the suggestion of Dr. Gray, as *H. vesicatoria*. Unfortunately I have mislaid my specimens, but the insects were much larger, heavier and more brilliantly coloured than those sent me by Mr. Moss. Mine were collected by myself from the Ailanthus trees of Han-Kow, and were, I think, females. In my early notes I described them as Cicadas. They were distinctly vesicant when prepared as ointment.

I learn from Mr. Butler, assistant keeper at the British Museum Natural History Department, that Messrs. Amyot and Servill founded the genus *Huechys* in 1843. They make three species of the genus, namely, *H. sanguinea*, *H. incarnata* and *H. philœmata*. They describe the genus thus:—Thin body, head rather small, triangular, as large as the prothorax; forehead angular, lightly compressed on each side, presenting underneath a kind of keel, or hollow edge of a longitudinal straight groove (or furrow) to the full length. Eyes large, not very prominent. Prothorax without lateral expansion. Elytra entirely opaque. Abdomen elongated.

The eyes in my Han-Kow specimens were very prominent, and the ocelli very distinct. I feel sure that if the insects were carefully collected and promptly exported, they would be found sufficiently vesicant for medical purposes. Chinese drugs are badly secured, slowly conveyed to certain drug emporia in Hunan, Hupeh (Han-Kau), Chekiang (Ningpo), etc., and then irregularly distributed all over the empire. The odd lots which occasionally reach Europe would be probably of very ancient date.

I do not know much of entomology, but I feel sorry that the Homopterous insects in question should have ever been separated from the genus Cicada, to which they seem to me to more properly belong.

Shepton Mallet. F. Porter Smith.

The Teaching of Botany.

Sir,—The Pharmaceutical Society is to be congratulated on the proposal for a completer specialization in the teaching of Botany, as foreshadowed in the report of the recent Council Meeting, and the intention of the Council that this subject shall be taught more in accordance with the requirements of modern science is to be commended. But surely the Council do not wish to ignore or to depreciate so important a part of pharmaceutical education as the recognition of drugs, their sources and active principles, together with a knowledge of common adulterants and methods for detecting them?

Has not the time arrived when the term Materia Medica may very well be discarded and that of Pharmacognosy be adopted in its stead?

In a complete pharmaceutical curriculum the subject demands especial attention and is well worthy of endowment as a separate branch of study.

If the multiplication of chairs be undesirable, why not attach it to the kindred subject, Pharmacy, and endow a chair of Pharmacognosy and Pharmacy?

Halford Street, Leicester. S. F. Burford.

A Successful Examinee.

Sir,—We, countrymen, compared with shrewd City men, are not supposed to have much wit, but occasionally we develop a faculty of making a little go a long way, which is akin to genius, whereof the following is an instance, culled from the provincial press:—

"Mr. ———, A.P.S., M.S.A., of ———, has recently been successful in passing the final examination of the Pharmaceutical Society; the Examination of the Apothecaries' Hall; the highest examination in the compounding and dispensing of medicines; and the highest examination in *materia medica*; and having acquitted himself so well as to stand highest in proficiency was awarded the medal of the college;" which, being interpreted, means that a certain cram-shop has passed another man through the "Minor."

Senex.

K. K.—The report contains a statement of all that took place in Court; the actual facts of the case and the conditions of settlement were not disclosed.

S.—Oxalic, citric and malic acids.

Indignans.—Any evidence you may be able to collect as to the supposed infraction of the law should be communicated to the Secretary, 17, Bloomsbury Square.

Inquirer.—The Bill is set down for consideration in committee on Tuesday next.

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F. C. F.—Your operation appears to have been conducted correctly; probably there was something wrong in one or other of the ingredients.

Communications, Letters, etc., have been received from Messrs. Cullinan, Rideal, Grierson, Walker, Warden, Flückiger, Wyley, Towcester, Civitas, Stellata.

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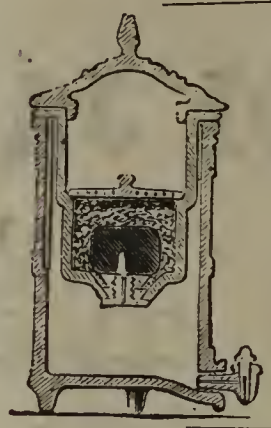

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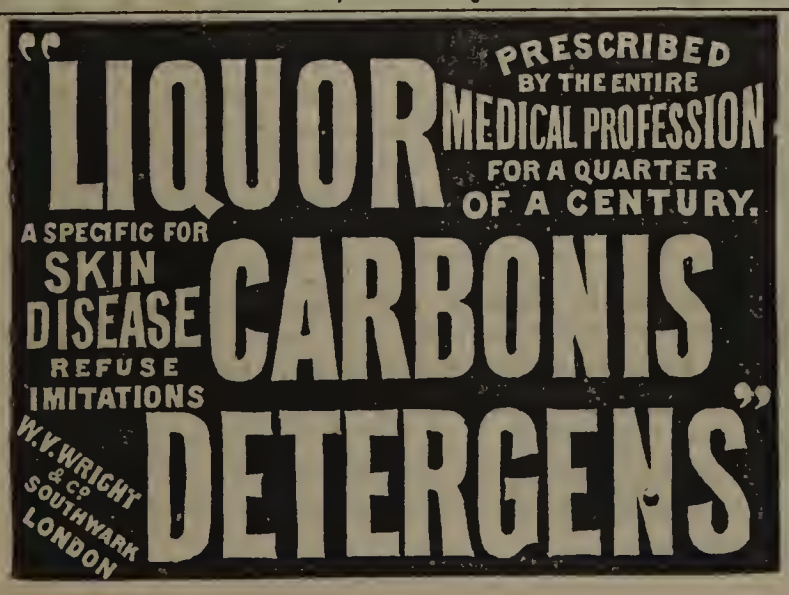

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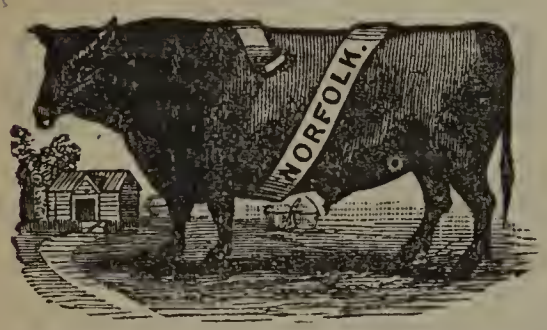

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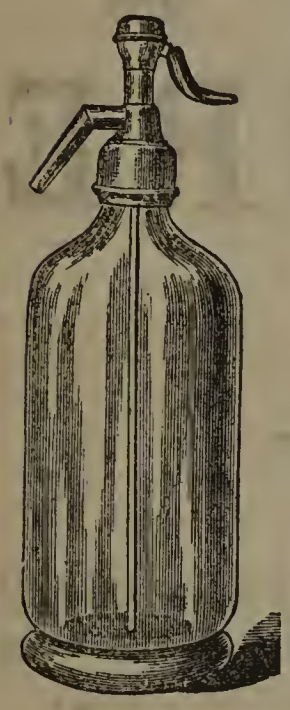

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As a remedy for Coughs, Colds, Asthma, Consumption, Hooping Cough, Bronchitis, Loss of Voice, and all affections of the

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This Balsam, which is prepared with great care and accuracy, will be found the most efficacious preparation that has hitherto been offered to the Public for any of the above complaints. Having sold it extensively for many years, and perceiving the great benefit derived from its administration, Mr. G. ANNETT is induced to give it greater publicity, fully assured, by so doing, it will soon become a well-known and popular remedy. Its composition is of so innocent a nature that it may be given to children with the happiest results. Persons whose mode of life expose them to the variations of the atmosphere will, by its occasional use, become fortified against attacks of cold and inflammation. It invigorates and strengthens the Pulmonary Organs, and by its action on the Mucous Membrane dislodges phlegm, thereby affording great relief to patients.

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JOHN BEEDZLER & CO.

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CONTRIBUTIONS TO THE HISTORY OF WARS.

BY PROFESSOR FLÜCKIGER.

In the *Pharmaceutical Journal*, xiv. (1884), p. 898, Mr. Kirkby figured a new variety of wurrus (or wars), and described it carefully. My friend, Edward Schär, Professor of Pharmacy in the Swiss Polytechnic School, Zürich, taking a great deal of interest in the matter, repeatedly obtained wars from a correspondent of his at Aden, which we found agreeing with those glands of *Flemingia* which I had first described in the *Pharmaceutical Journal*, ix. (1868), p. 279, under the incorrect name of "New Kamala." For they are by no means due to some *Mallotus*, like true kamala, but to the pods of *Flemingia*, as shown in the *Pharmaceutical Journal*, xiv. (1884), p. 917, by Professor W. T. Thiselton Dyer, F.R.S., now Director of the Royal Gardens, Kew.

Professor Schär recently received a new supply of wars from Aden, which I find to agree with Mr. Kirkby's curious variety. This variety indeed is totally different from both the glands of *Flemingia* ("new kamala"), and those of *Mallotus philippinensis*, the true kamala. Kirkby's drug has a dull brown rather than a reddish hue, which I find is not altered by a temperature of 100° (212° F.), whereas the dark violet of the *Flemingia* glands, if heated to that degree, turns decidedly blackish, as first ascertained by my late friend Daniel Hanbury (see 'Pharmacographia,' 1st edition, 1875, p. 518). This is the more striking, as the same glands, by boiling them with water, yield a turbid yellow decoction of much the same colour as an emulsion of gamboge. This decoction, after cooling at 15° C., remains turbid and is not altered by addition of a solution of iodine (iodine 3, iodide of potassium 8, water 1180). If we treat true kamala in the same way a slightly opaque yellowish decoction is obtained; in the cold it is not altered at all on mixing it with solution of iodine.

We may therefore distinguish three different drugs, viz.:—

I. Kamala, the well-known glands of *Mallotus philippinensis*.

II. Wars, the glands of *Flemingia rhodocarpa*, Baker, a species not specifically distinguishable from *Flemingia Grahamiana*, W. and A., growing in Southern India, as pointed out by Professor Oliver (*Pharm. Journ.*, xiv., 969). As to *Flemingia congesta*, Roxb., its glands agree with those of *F. rhodocarpa*. But at Kew they have no evidence that this plant grows in Arabia, so at least I was informed by a kind note of Professor Thiselton Dyer's, September 4, 1883.

Wars from *Arabia* is therefore to be attributed to *Flemingia congesta*, and the source of the drug of the *Somali coast* is *F. Grahamiana* (*F. rhodocarpa*). This species also occurs in the Mozambique district.*

III. *Kirkby's Wars*, as we may term it until further information be afforded. The specimen with which I was presented by Professor Schär had been imported into Aden from Harrar.

As to the latter, it may be separated into three different constituents. Firstly, by shaking the drug No. III. with water and pouring it off, very minute grains or fragments are deposited from the water which are not altered by iodine. I can only state that they mainly consist of inorganic matter mixed with a few simple hairs; suffice it to class those fragments as dust. Secondly, if the drug is again shaken with a little water, pouring off the turbid liquid in a watch glass it soon deposits the very glands of "Kirkby's wars" (fig. A.). And thirdly, at the bottom of the flask there collects a large amount of heavy brown matter, which, in all probability, has nothing to do with wars; it consists of something like ferruginous sand, which I thought not worthy of any further investigation. The sample of the drug before me, in fact, afforded by calcination no less than 45·15 per cent. of a blackish-brown residue, rich in, or mainly consisting of, ferric oxide, not displaying any effervescence when moistened with nitric acid.* The drug yields but very little to alcohol; even on addition of a few drops of ammonia water a faintly, but purely yellowish filtrate is obtained, which, on addition of ferric chloride assumes a dingy brownish hue. If the drug under notice is boiled with water, it yields a clear, extremely slightly yellowish, or a little reddish filtrate, which after cooling and mixing it with aqueous solution of iodine, displays a *rich blue coloration*. This behaviour at once allows of the identification of "Kirkby's wars" with certainty, provided starch granules be absent.

Its true character may be shown by the above-mentioned second portion of my drug. Mr. Kirkby terms, I think correctly, his wars "glands," and figures them *l.c.* I would only remark, that their appearance, in my opinion, is not exactly granular as shown in Kirkby's fig. A. (*Pharm. Journ.*, May 10, 1884, p. 898), but rather cloudy, or somewhat, as it were, stratified, or shrivelled. The glands, on an average, are not larger than those of true wars ("new kamala"), but of a totally different outline. They are either nearly globular, or ovoid, or slightly tapering, many of them reminding, as to their shape, the starch grains of potato; sometimes also there are tapering, or nearly kidney-shaped or crescent-shaped forms, or glands approaching to a cylinder (see fig. A.). In fact, as Mr. Kirkby already stated, there is scarcely any prevailing form. The following sketches, under A., may, at least, afford an idea of the great variety exhibited by those curious glands.

If they are moistened with an aqueous solution of iodine, their very faintly reddish hue is at first but very little affected, by and by it turns more distinctly red or somewhat violet. After a few minutes blue spots make their appearance in the glands, resembling to some extent granular matter enclosed within some membrane. Are these blue spots due to starch? I do not believe so, having in no way succeeded in isolating starch granules from those glands. No starch is to be observed, if the glands are, for instance, submitted to a strong pressure between two glass slides, the

* Sir Joseph Hooker, 'Report on the Progress and Condition of the Royal Gardens at Kew during the year 1881 (1882), p. 50. An abstract will be found in the *Pharmaceutical Journal*, xiii. (1882), p. 533.

* Mr. Holmes obligingly sent me a sample of the drug which had been examined and described by Mr. Kirkby. Of this, 0·448 gram, dried at 100° (212° F.), gave 0·249 gram of the same residue as afforded by my sample, *i.e.*, 55·58 per cent. of blackish-brown matter which yielded but very little to chlorhydric or nitric acid. I need scarcely say that the drug as received from Mr. Holmes agreed also under the microscope with that described here.

blue coloration produced by iodine is not at all to be observed without the glands, but only in their interior part.

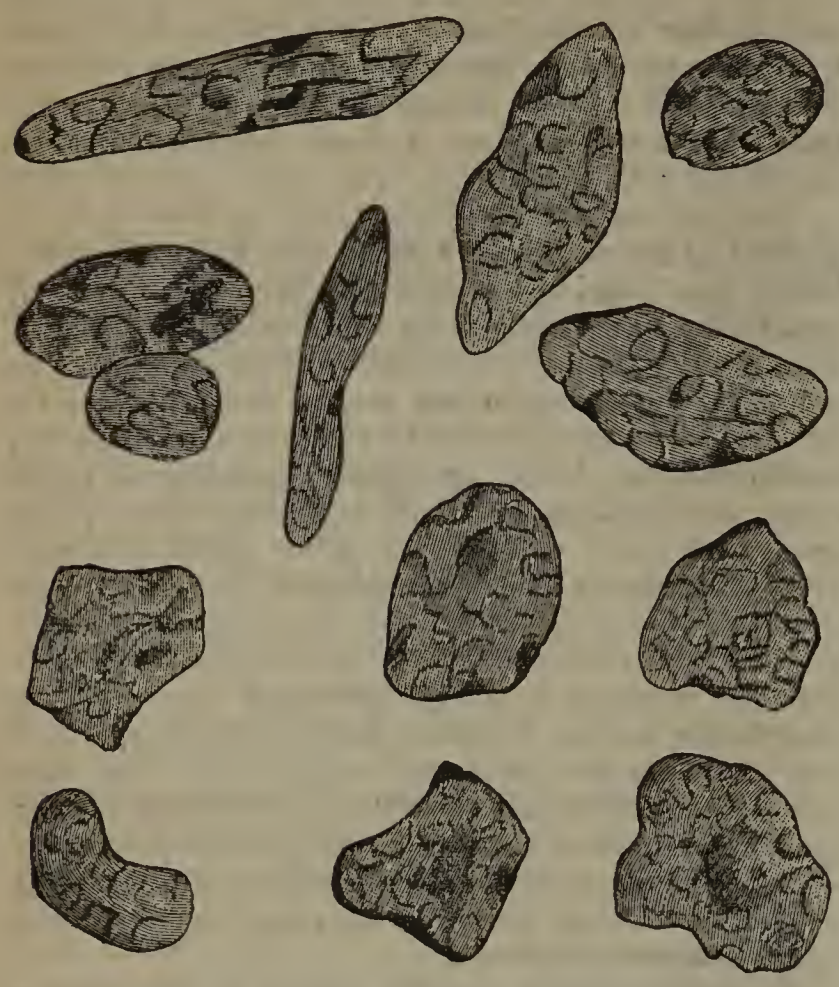

Fig. A.—Glands as seen under glycerin.

If a more concentrated solution of iodine be applied, the whole glands at last become uniformly and thoroughly blue. Their substance is not obviously altered by boiling water, although the filtrate, as already stated, contains a little of the matter to which a blue coloration is imparted by iodine. If the glands are boiled with concentrated caustic lye, they are not much altered, nor has ammonia water any marked action on them.

The above experiments show that they are certainly not starch granules. Sulphuric acid (1·830 specific gravity) affords the best information about the structure of the glands under notice. They are immediately altered by the acid, their outer portion becoming perfectly hyaline, whereas the central portion continues to display the original cloudy or stratified appearance. Yet this nucleus also is soon penetrated by the acid, and then the gland is manifestly shown to be made up of a large number of small cells. Their delicate walls are not dissolved by the sulphuric acid, or at least disappear only after a day; in this respect they would remind of cork or suberin, which is so remarkable on account of its not being dissolved by concentrated sulphuric acid. It is a well-known fact, that the walls of many glands or ducts are made up of corky substance, as, for instance, the oil ducts in the rhizome of the Zingiberaceæ.

As to the cells which are made apparent by sulphuric acid, they are not arranged in any regular order and are strongly coherent, so as to form one mass, *i.e.*, the whole gland is nothing else than an agglomeration of minute cells, which as above mentioned cannot be separated by means of pressure. At last the whole contents of the glands are dissolved by sulphuric acid, and the solution turns blue if it is mixed with an aqueous solution of iodine.

Now, the glands being a coherent agglomeration of cells, the question arises whether they are really included in a surrounding membrane or cuticle. If they are kept for a day in a saturated solution of chloral hydrate, the little cells become much more evident and quickly take up iodine from the solution already mentioned. Many of the glands then distinctly show a very thin colourless outer coat or layer. At the same time it may be observed that the contents of the cells do not swell; they would do so if they consisted of starch granules, for starch is quickly disintegrated and gradually dissolved by chloral hydrate;* no such tumefaction is produced by the action of chloral hydrate on the glands under notice nor on the cells they are containing.

Concentrated sulphuric acid, as already alluded to, also makes evident the existence of a delicate membrane covering all the little cells, but the acid carries a portion of the contents of the cells out of them; the acid solution around the cells turns blue on addition of iodine. The action of chloral hydrate is safer for that purpose, or also that of chromic acid (1 in 200 water).

Yet to clear up the constitution of the glands I at last found best quite another method. I heated the glands with a little water in a sealed tube to about 130° (266° F.) when I obtained a pasty mass. On diluting it with water and filtering a clear liquid was obtained, which turned blue by iodine and became turbid on addition of alcohol. The solid portion remaining on the filtrum examined microscopically showed a great variety of changes undergone by the glands. Some of them were but little or not at all affected, many of them distinctly showed nearly the same structure as after the treatment with chloral hydrate.

Many of the glands however were now seen empty, *i.e.*, reduced to the very membrane, which can thus be demonstrated most convincingly; it does not absorb iodine which is readily taken up by the disintegrated cells. Even after that treatment many of those glands which are least altered by heating are not thoroughly blue, but only display blue spots answering to the little cells they contain.

These experiments performed by me afford in my opinion sufficient information about the structure of the glands. They are loaded with an agglomeration of numerous delicate empty cells, the walls of which are coloured blue by iodine, and partly dissolve in boiling water. It is very remarkable to observe how obstinately the cells stick together.

I thought it well worth to insist on the glands under notice, inasmuch as I am not aware of another instance of any analogous formation. The cells included in the glands would appear to agree with dextrolichenin,† or with a substance occurring in the seeds of tamarinds,‡ or in the buku leaves.§

As to the mother-plant of the glands of "Kirkby's wars," nothing is known to me. They are widely differing, both in their structure and their chemical behaviour, from the glands of the two *Flemingias* constituting true wars. There can be no doubt as to the vegetable origin of the former; heated in a glass tube they evolve acid vapours.

* As shown by me in the *Archiv der Pharmacie*, cxcvi. (1871), p. 7; also 'Pharmacographia,' second edition, 1879, p. 632.

† 'Pharmacographia.' 2nd edition, p. 739.

‡ Flückiger, 'Pharmakognosie,' Berlin, 1883, p. 802.

§ Dr. Shimoyama, not yet published investigation.

In the 'Pharmacographia,' 2nd edition, p. 573, mention is made of Masudi, who informs us (10th century of our era) that Ginbil consisted of *sandy* fruits of red hue. In my 'Pharmakognosie des Pflanzenreiches,' Berlin, 1883, p. 237, I have more explicitly shown, that *Kanbil*, *Kambil* or *Quinbil* are old Arabic synonyms of wars. The old Arabic authors would appear to have known not only the Indian kamala, but also two varieties of wars ; the red variety, perhaps, was that more exactly termed kanbil.

In the Pharmacopœia Persica (see 'Pharmacographia,' second edit., p. 753), in a medicine against "latos lumbricos," mention is made of *qambel, seu arena ad vermes* (p. 85), and *quambel, arenula Arabica contra vermes* (p. 86). This no doubt also agrees with the drug under notice. In the first place wormseed is associated with qambel together with semen convolvuli coerulei, or, at p. 86, with grana campanulae coeruleae. I scarcely need to point out that those seeds or grains mean the semen kaladanae, described in 'Pharmacographia,' p. 448. As qambel is expressly termed a sandy matter it would appear that there cannot be question of a sophistication with sand.

Avicenna* gives some very curious information about wars and khanbil, far from clear, yet interesting. He tells us: "*Warts*, Croci indici pollen. Est res rubra, crocum probe attritum aemulans atque e felice Arabia advehitur, dicitur illic e plantis desumi . . . Ad scabiem pruritum, achores et impetiginem est utilis." Scholium Plempii: "Hanc plantam scribit Golius in suo lexico esse Sesamo similem, flavescentem, quae in sola Arabia felice provenit; ex qua paratur gomraton, hoc est linimenti genus, quo facies mulieres tingunt conciliandi nitoris ergo . . . Illud ipsum vocabulum Warts apud celebres botanicos significat enronmam et crocum."

"*Khanbil*, Sementina seu semen lumbricorum, Semen est *arenaceum*, rubro colore suffusum, dilutione tamen seu minus rubro quam præditus est Crocus indicus . . . Lumbricos ascaridesque necat et expellit." Scholium Plempii: "In Arabico est Warts, Porro video etiam Arabibus incertum esse quid vere sit Khanbil. Scribit enim Elkharasjius . . . esse *terram rubram* minutam."

The repeated allusion to red sand or earth is worth noticing with regard to the large amount of inorganic matter which I found in Kirkby's wars.

Paulus Aegineta also speaks of yellow and red "Vertz," or "Vars," as mentioned by Rhazes, both kinds brought from Yemen. In Adams's edition of 'The Seven Books' of Paulus, III. (London, 1847), p. 457, the drug is, I think wrongly, attributed to *Memecylon tinctorium*, Willdenow, a plant abounding in yellow colouring matter, but not occurring at all, as far as I know, in countries which afford wars.

Possibly the glands to which these lines are devoted are the khanbil of olden times.

In looking again at the very specimen of true wars which I had described, nearly twenty years ago, under the name of new kamala, I am struck now to find an extremely small number of Kirkby's glands accompanying those of *Flemingia*.

In publishing my note I hope it will contribute to clear up definitely the history of the drugs under notice, which have been, in the East, in use for so many centuries.

* 'Canon ed. Plempius,' Lovani, 1658, fol. 116 and 255.

NOTES ON EXHIBITS OF PHARMACEUTICAL INTEREST IN THE LIVERPOOL JUBILEE EXHIBITION.

The fine Exhibition building which contained the Liverpool International and Maritime Exhibition of 1886, has again been filled with an interesting and splendid loan collection, illustrating peace and war.

The various classes of exhibits comprise War Trophies, Exploration, Colonial and Indian Courts, Life Saving and Ambulance Divisions. The vast building (the largest of its kind) is tastefully decorated with banners, palms and ferns, which, together with the magnificent collection of armour, present a most attractive appearance. Other attractions have not been neglected, in the reproduction of an old Lancashire village, and several of the ancient and historic buildings of Liverpool, amongst which the old Castle, the Tower and Exchange have been resuscitated in a realistic manner.

There are many exhibits of interest to the pharmacist, including the fine collection of medicinal plants, oils, gums and drugs illustrating the economic products of India.

This collection is lent by the Committee of the Imperial Institute, and shows the enormous resources of our Colonial possessions.

Foremost among the drugs are samples of Indian opium, showing its preparation from the incised poppy capsule to the crude opium, the juice derived from the unripe capsule, and finished in the provision opium cake, as prepared for the China market.

There are also specimens of the alkaloids morphine, codeia, and narcotine, in the crude and pure state manufactured at the Ghuzipur opium factory. Some fine samples of the *Aconitum ferox*, *Napellus*, and *heterophyllum* are shown. The latter variety does not possess any poisonous properties, and is used as a tonic in India. The various cinchona barks are largely represented, including some splendid specimens of the official red bark. In addition there are seeds of the *Gynocardia odorata*, the chaulmugra, the expressed oil from which has been introduced to this country, its active principle being gynocardic acid, and *Cannabis Sativa*, Indian hemp, which is so largly used in India both for smoking and its narcotic properties, the young leaves and twigs collected from the semi-wild plant being used in the manufacture of the intoxicant liquor known as hashish. Specimens of *Hyoscyamus niger*, *Datura stramonium*, and *Atropa belladonna*, which are now cultivated in the temperate districts of the Himalayas, are also shown. The seeds of *Eugenia Jumbolana*, or *Taman*, are not much known in England, although used in America, and are said to be useful in the treatment of diabetes.

Some fine samples are shown of catechu, which is largely exported from India and Burmah. The cutch produced by the North West provinces is very different in appearance to that exported from Pegu, it being paler in colour than the Burmah cutch, and made into larger cubes. It is said to be purer and more carefully prepared. Several fine varieties of turmeric are represented, it being largely cultivated for home use, also some good specimens of Bael fruit, almost every part of this tree being utilized in India.

The *Semecarpus anacardium*, or marking nut tree, from the nuts of which an acrid juice is extracted that is used medicinally and as a natural marking

ink for linen. Among the oils are samples of the essential oils of cloves, caraway and cinnamon, also an oil extracted from the small cardamom fruits by distillation. There is also a clear oil obtained from the seeds of the sunflower, a plant which grows to great perfection and size in India. The seeds are stated to yield 22 per cent. of this oil.

A rose oil, or common otto of rose, prepared in the North West Provinces and the Punjaub, is also exhibited in the West Indian Court; kola nuts and some excellent samples of arrowroot are represented.

The Ceylon section exhibits several varieties of cardamom seeds, cinnamon, and a collection of cinchona barks grown by the Ceylon Planters' Association.

In the Australian Court are specimens from the numerous eucalypti, both the gum and leaves. Messrs. Cullerne and Co. exhibit some beautiful samples of isinglass, from the finest Russian to the coarse Astrachan leaf; also samples of Balaga and Sargin leaf and Brazilian isinglass of excellent quality.

In the Ambulance Court may be seen some admirably fitted up field medicine chests, from the size of a knapsack to the field hospital ambulance waggon, sent by the Woolwich Government Stores. The Netley Hospital authorities also exhibit a compact and complete ship's hospital, showing the latest improvements.

From this glance round, in which only a few of the many interesting exhibits have been enumerated, it will be seen that the Liverpool Exhibition will well repay a visit.

NOTES ON THE SAFFRON PLANT (CROCUS SATIVUS, L.), AND IN CONNECTION WITH THE NAME OF THE TOWN OF SAFFRON WALDEN.*

BY JOSEPH CLARKE, F.S.A.

"The rosy morn in saffron drest."

Taking into consideration the short space of time that, during a day's excursion, can be allotted to the reading of papers, it would be a work of supererogation to inflict an elaborate botanical description of the plant saffron, which may be obtained from any herbal. It was successfully cultivated in the neighbourhood of Walden for somewhat over two centuries, but has disappeared for nearly half that period, and though it has no pretension to be called indigenous, it finds a place in every British flora and treatise on medical botany, and even in the Pharmacopœia, so unwilling are we to give up so interesting a plant and so charming a flower. The time of its introduction into this country is not precisely known. As with many other things, from a glimmering through the mist of ages past, it is believed that the Romans brought it with them.† The earliest accounts make mention of it growing near a Roman road, running through Essex. This might be Saffron Walden. As the modes of cultivation have gone completely out of the memory of living man, a brief description may not be uninteresting to even the most scientific of the pilgrims of the gatherings of to-day. That the flower and its accredited virtues had great attraction for the ancients is certain. It is conjectured to be the *Nepenthe* of Homer, and the Greek name is *Krokos*, signifying a thread, from the thread-like appearance of the pistils, when dried for use. The name in Hebrew is *Chorukim*. Loudon derives the word from Chaldee, *Krokice*. The common name of the plant, with slight modifications, in English German, French, Dutch and Spanish, is the same as the Arabic *Zahafran*, which, with the Z softened into S, and pronounced quickly, would be exactly similar to our word.* That the plant was held in high repute at an early date by the people of the East, is to be learned from the "Song of Solomon" (iv. c., 14 v.)—"Thy plants are an orchard of pomegranates with pleasant fruits, camphor with spikenard and saffron." The bulb or "corm" is about the size of a nutmeg, compressed at the bottom; the young leaves and flower are contained in a thin sheath, from which they emerge simultaneously. The flower, though not quite so robust, is similar in shape to the well-known spring crocus (*Crocus verna*, L.), but is of a lilac or light violet colour, in the centre of which, about half the length of the petal, is a slightly formed style supporting three stigmas of slender shape and orange golden-yellow colour. Part of this style or "string," with the stigmas or "chives," is the saffron of commerce. The foliage of the plant, like that of all the crocus tribe, increases in length long after its bloom has faded, and may be readily known by its extreme attenuation. With the exception of some of the finer grasses, the leaves of the crocus are more slender in comparison to their length than those of any other British plant.

Dr. Douglass, between the years 1723 and 1728, employed proper persons to make observations on the culture of saffron then growing on a large tract of ground extending from Saffron Walden towards Cambridge. The land accredited to be most conducive to its production was a temperate dry clay, not too stiff, on a substratum of chalk. Early in April the ground was ploughed more deeply than for corn; in May twenty, thirty, and even forty loads of short rotten manure on an acre were ploughed in, and at Midsummer the land was ploughed a third time. The roots were planted in July in rows six inches apart, and three inches from each other. Only the round roots or "corms" were planted; the flat and spiked roots being rejected; and about 128 bushels per acre was the allowance of "seed." In September the ground was well hoed, and the weeds destroyed. At the latter end of September, early in the morning, Sundays not excepted, the flowers were gathered, when the "chives," that is the style and stigmas, were retained, and the rest of flower discarded. These parts of the flower were dried upon a kiln, covered with a wire netting or a hair cloth, over which were laid several sheets of paper, and weighted. This process required great care and watchfulness. After an hour the coverings were taken off, the saffron turned upside down, and then covered and weighted as before for another hour. If this operation was successful there was nothing more to do, but simply to turn the cake over a gentle fire every half hour for twenty-four hours. Inferior chives were sprinkled with small beer to make them sweat. About five pounds of wet saffron made about one pound when dried, but in the latter part of the season six pounds were needed. The average portion of dried saffron obtained from an acre the first year was rarely over two pounds, twelve for the second year, and rather more for the third. After this third crop, the midsummer following, the roots were taken up and transplanted to new ground.†

Dr. Douglass's estimate for an acre under crocus cultivation in 1728, was:—

	£	s.	d.
Rent for three years.	3	0	0
Ploughing three times.	0	18	0
Dunging	3	12	0

* Reprinted from the *Essex Naturalist*, January. This paper was kindly written specially for the Meeting of the Club at Saffron Walden, on April 14th, 1884, by the venerable author, who is so well known as a local archæologist and naturalist. We are indebted to Professor Boulger for several notes and memoranda used in passing this paper through the Press.—*Ed. Essex Nat.*

† Cole, 'Adam in Eden 1657.

* "Crocus is named in greeke Crokos, in englishe saffron or safforne, in dutche saffran, in frenche safrone, it is hote in the second degree and dry in the fyrst." Turner, 'Names of Herbes' (1548).

† See *Philosophical Transactions*, Nos. 138, 380, and 404.—*Ed. Ess. Nat.*

	£	s.	d.
Hedging	1	16	0
Splitting and setting the heads.	1	12	0
Weeding and paring the ground	1	4	0
Gathering and picking the flowers	6	10	0
Drying the flowers	1	6	0
Instruments of labour for three years	0	10	0
Ploughing once, harrowing twice	0	12	0
Gathering the roots	1	0	0
Raising or cleaning roots.	1	12	0
Total charge	£23	12	0

It has been stated that saffron was introduced into England directly from Asia.* Hackluyt (1582) says that the root was first brought here in the reign of Edward III., by a pilgrim from Tripoli, who concealed it in his staff; had it been discovered, he would have been liable to the penalty of death. This story may be mythical, but Edward III. was renowned for his encouragement of industry of all kinds. To Sir Thomas Smith, a native of Walden, Secretary of State to Edward VI., is attributed the introduction of it to the town of Walden, but though it was grown to a large extent, and its cultivation certainly facilitated by him, he could scarcely have been the means of originating the industry, as the Charity Commissions' report speaks of two saffron gardens belonging to Gepy Simmonds, in 1481, and in the Churchwarden's accounts for Walden, 2nd Richard III., is this entry :—Itm. Payd to John Rede for pyking of V unc safron xiid."—and Flemming, a clergyman who resided in the neighbourhood, relates that in 1584 it was extensively grown here; and that in 1565 its abundance was so great that the pickers were offered half the produce for their labour. In many of the wills of the time mention is made of saffron gardens, from half an acre to three acres. This is attested by quotations from the ancient records of the town, 1st Henry VIII., "Qd diversi tenentos hujd manerii trent porcos suos in gardinis crocd." 10th Henry VIII. "Itm. 9d. Johes Geyner & Robertus Rosale, trent porcos suos, vagantes ad largū in gardinis crocor'teñ & in blade & graine." Hackluyt in 1582, alludes to Walden as the principal seat of the saffron culture, and Camden† and Gerard‡ describe it as being in the highest perfection at the period of their writings. From the former writer they copy what is certainly to be received with reservation, that barley will grow after saffron for eighteen years in succession without any additional manure, and that saffron will grow after it again. A skilful farmer understands the rotation of crops, and what plants will follow each to advantage; and a practical agriculturist, here on the spot alluded to, says that four crops of barley may follow each other, but not without extra manure. Hackluyt, Camden, Gerard and Ray all mention Walden as the chief place of saffron cultivation, for whence it gradually extended in nearly a northern direction through the villages of Cambridgeshire to Cambridge. In 1531 the town accounts of Cambridge show that saffron was grown in Cambridge and Barnwell to a great extent. In Barnwell-field there were twelve acres; the prior of Barnwell had ten acres; and in Cambridge fields there were eight acres and three roods planted. At this time the price varied from 60*s.* to 20*s.* according to good or bad seasons. In John Norden's account of Essex, 1594, is written "About the town of Walden groweth great store of saffron, whose nature, in yelding her fruite, is verie straunge, and bindeth the laborer to greate trauaile and dilligence; and yet at length yealdeth no small advantage to recomforte him agayne."

Camden says, "The fieldes here (Walden) on every side smell sweetly, and smile pleasantly with saffron." About half a century ago, in trenching the triangular piece of ground, now the lawn on the western side of the Museum, a small plant of saffron came up, possibly from a latent imported seed, but otherwise not to be accounted for. That the plant has been confounded with *Colchicum autumnale* (the "meadow saffron") is evident by the description of it given by various authors, ancient and modern. Dioscorides, a physician in the earliest century of our era, describes it as an acrid poison, and Gerard ascribes to saffron potent qualities which it does not possess.* In many of the British Floras it is said to be indigenous, and even so eminent a botanist as Sir J. E. Smith has fallen into the error. Loudon makes no distinction between the two species, but our accomplished botanist Ray knew better; he says, "Nothing is known concerning its place of spontaneous growth, and no wild plant is to be seen where it had been cultivated two hundred years."

Saffron is said to be a mild aperient, but its medicinal uses are now confined to the measles and a few other complaints. The old-fashioned people of the last generation used it in mild cases, and rhubarb in more virulent ones. I well remember their medicine boxes containing both these drugs. A list of the prices as recorded in the 'Liber Fraternitatis Sanctæ Trinitatis de Walden' may be interesting, but it must be remembered that money was then of far more value than now.

	£	s.	d.
1540. For a pound of saffron to give my Ladye Pagett	0	12	0
1561. A pound of saffron given to the Queen's attorney	1	5	0
1614. Bought 4 oz. of saffron, 15*s.* 4*d.*, bought a pound of saffron	3	3	4
1629. Paid for v ounces and a half of saffron at 18*d.* per ounce	0	8	3
1653. 1 lb. of saffron presented to my Ladye	1	17	0
1661. For a pound of saffron, paid Pratte for gathering the heads 4*d.*	3	10	0
1665. Paid for a 1 lb. 4 oz. of saffron	4	1	10
1689. Presented to King William III., when he came to Audley End, 14 ounces of saffron, which cost.	3	3	8
1717. Paid for a silver salver to present some saffron to King George, £4 11*s.* Paid for the saffron	1	6	6

Saffron varied much in price in abundant or unproductive years, but from this time, from foreign introduction and from its disuse as a medicine, it rapidly declined both in cultivation and value. Probably I am almost the only man who has ever seen a field of saffron in bloom—that is, in this vicinity. The last of the saffron growers, with whom I was well acquainted when a child, was named Knot. He lived at Duxford, in Cambridge, about six miles N.W. of this town. He grew about half an acre, and made a journey once a year to dispose of his produce. In later years the journey was too much for him, and his friend, William Thurnal, acted for him. Up to 1816 he continued to grow saffron, and in 1818 the only remains of the crocus were to be found in his garden. I well remember the clay ovens and the sheets of white-brown paper used in drying the chives. In a conversation with his grandson some years after, he laughed at the notion recorded by Camden that the flowers should be gathered early in the morning, before sunrise. The only other saffron that I have ever seen was a bed in the garden of a celebrated amateur

* It was cultivated by the Arabs in Spain, about A.D. 960, and is mentioned in English leech books of the 10th century. See Ellacombe's 'Plant-lore of Shakespeare.' —*Ed. Ess. Nat.*

† 'Britannia,' vol. i., p. 426. The passage is quoted at length in Gibson's 'Flora of Essex,' p. 312.—*Ed. Ess. Nat.*

‡ 'Herball,' Ed. 1597, p. 123; Ed. 1633, p. 152. So also William Bulleyn in his 'Government of Health' (1588)—"Our English hony and safron is better than any . . . ."—*Ed. Ess. Nat.*

* Ray does the same. 'Synopsis' (Ed. 1724), p. 374.—*Ed. Ess. Nat.*

florist, Mr. Charles Baron. At his demise his garden passed into other hands, and the saffron failed. The saffron farmers were called, by way of distinction from other farmers, "crocurs," and from the uncertainty of the crop from disease in the bulbs, and the changes of this variable climate in September and October, the profits were very precarious, occasionally ruinous; which gave rise to habits of habitual discontent, and it may be inferred that the word "croaker," now a common appellation for a grumbler, was so derived! Saffron, in some shape or another, is still used in confectionery, probably only as a colouring matter, and for colouring butter and cheese.* In the county of Durham it is largely employed in the manufacture of biscuits, buns and cakes. Such things bought in the confectioner's and bakers' shops around Bodmin, Penzance, and Land's End are coloured with saffron. Nothing of the kind is heard of here. In Ireland these cakes are well known and used. The late Lord Talbot de Malahide, as an inducement for me to visit him in Ireland, said he would treat me with saffron cakes; and Mr. Maynard informs me that in the Museum here lately an Irish lady said that saffron cakes were now extensively used in her country, especially in the neighbourhood of Dublin. The commercial value of saffron is chiefly for the dye which it affords.† There are many imitations of it, some of great beauty, but they lack the charm of the floral tincture. There is nothing analogous in nature to the delicately rich and beautiful tint which is supplied by the stigmas of the saffron blossoms, excepting the hue of early morn, to which the poet has referred—

"How, when the rosy morn begins to rise,
And wave her saffron streamer through the skies."

I think it is a flower which might with advantage, as a late autumn beauty, with its light violet or lilac blossoms, be introduced into our gardens.

I will now devote a few lines to the name of the town in connection with the saffron plant, and the time when it assumed its present prenomen. It never was a large town, but was an important one from its Castle and Monastery, and from being the only market for many miles round. In Doomesday it is called Waledana; on the earlier seals of the monastery it is Waledeni; in a later and better executed seal on a deed of 1534 (the seal may be earlier) it is still Waledeni, without a prefix. At different times the town has had other additions to its name, as Walden-burg, Brook Walden, Chipping Walden, (Cheaping), which latter probably has much to do with the present name. A gentleman from the British Museum, on looking over some old deed, said: "I think I can help you; here is 'Seffing Walden'"; but I was doomed to disappointment; the parchment was stained and crumbled, and on closer inspection the word turned out to be "Chepping." Yet this raised the surmise, the town being the chief mart for the commodity, that this name, aided by the misspellings of the time, had gradually merged into saffron.

On a seal attached to the charter of Edward VI., 1549, is depicted three *brooms*, intended for saffron flowers, surrounded by a wall, forming the miserable pun of "Saffron Wall'd in"; this is the earliest record I can find of the prefix, nor does it appear to have been used before the year 1530. The Corporation were very unwilling to adopt it; their election book makes no use of the prefix until 1729.‡

When the present seal of the Corporation was fabricated the saffron blossoms were depicted more naturally than in the 16th century. A late lord asked whether the heraldry had not been spoiled, but his lordship was reminded that his family were going to replace the griffin supporters of his arms by lions, and he was asked if he intended to have the long cat-lizardlike lions of Edward III., or natural animals? The only response was a shrug of the shoulders. An old heraldic painter who had been accustomed to depict the ancient form of lion, was anxious to see a living beast, and when the Zoological Gardens were first opened went there. On being shown one he disputed rudely with the keeper, and left in great anger, believing he had been hoaxed. On entering what may be said to be almost a public room in the town (connected, I may say, with a most accomplished British botanist, now, alas! no more), the visitor is confronted with a frieze running round it of what may be surmised to be plants of the genus *Orchis*, but he is surprised to be informed that they are intended for our celebrated plant saffron. Again, the fabricator of the effigy on the east wall of the new town hall has strictly obeyed the injunction "Thou shalt not make to thyself the likeness of anything in heaven above or in earth beneath." Eight saffron heads will be seen in the spandrels of the arches in Walden church, exactly opposite the north porch.

Another incident connected with the name of the town may amuse; there is a phrase "Saffron Walden, God help me," heard all over the kingdom, in the wilds of America, and even in Australia. When the almshouses were re-established in the reign of Edward VI. the recipients of the charity had but a miserable pittance, and had a licence from the King to beg. As this was soon after the Reformation, when so many priests were reduced to mendicity, and were wandering about holding out their hands, "A poor priest, God help me!" so the licensed recipients of the Walden charity, when asked where they came from, exhibited their licences with "Saffron Walden, God help me!" and seeing that this freed them from prison, other beggars adopted the cant words. In a manuscript that I have on the dissolution of Tiltey Abbey, near Thaxted, Father Thomas, a favourite priest, was allowed 4*s.* 6*d.* a week from the parish of Thaxted, the others were reduced to beg their subsistence. *Deo adjuvante floremus* appears to be a Latin parody of the beggar's phrase.*

* Shakespeare's reference to it ("Winter's Tale," iv., sc. 2)—"I must have saffron to colour the warden pies," indicates its common use for this purpose in his time.—*Ed. Ess. Nat.*

† "The chiues, steeped in water, serue to illumine, or, as we say, limne pictures and imagerie, as also to colour sundry meats and confections."—*Gerard.—Ed. Ess. Nat.*

‡ The plant has also given its name to Saffron Hill, formerly part of Ely Gardens, Holborn; to Zaffarano in Sicily; and to Zafaranboly in Anatolia.—*Ed. Ess. Nat.*

* I also can recall the proverbial use of this phrase. My mother would sometimes quote a saying of my grandfather's, who was a Norfolk man, descriptive of any importunate person:—"He's only a Saffron Walden God-help-us."—*W. Cole.*

† From the *Pharmaceutical Era*, May.

PHARMACY IN JAPAN, PAST AND PRESENT.†

BY M. T. KAWAMURA.

The recent publication of a Japanese Pharmacopœia turns attention to the general question of pharmacy and medicine in Japan. We are not to suppose, because the Japanese have not heretofore had a Pharmacopœia like those of European nations, that they were without medicines. Even the most ignorant people know something about the use of remedies. It is an instinct with four-footed animals to seek relief from pain in the use of medicines, as we see dogs eating grass for a heartburn.

In oriental countries, medical science was taught a thousand years before the Christian era, and many of the medicines they used are still prescribed in civilized countries. So late as the fourteenth to the sixteenth centuries, the oriental people surpassed Europeans in their knowledge of medicine as they did in their general civilization. Chinese medicine was introduced into Japan by the Coreans about two centuries before the Christian era, and from that time our people generally adopted the medicines and the medical science of China. Most of the Chinese medicines are from the vegetable and animal kingdoms. Few inorganic substances were used. Antimony, however, has been employed in China two

thousand years. The vegetable drugs were, many of them, those now universally adopted, such as cinnamon, peppermint, rhubarb, jasmine, licorice root, and gentian. The following is a specimen of an old Chinese prescription, recommended for a patient who had taken cold, and complained of headache, dryness of the mouth, and inability to sleep :—

℞	Gentian.	℥iij. (by weight)
	Scullcap	℥ij.
	Evodia glauca	℥ij.
	Jasmine, pieces	No. xiv.
	Water	℥viij.

Boil about half-an-hour, until the liquids measure 6 fluid ounces, then strain through muslin or silk. To be taken in warm liquid three times a day, between meals. (The drugs were to be used in such cases generally in the form of a coarse powder, No. 12 to No. 20.)

Most of the medicines used internally were prepared in the above method, by decoction. Medicines were also employed in the form of extracts, syrups, pills, ointments, plasters, and liniments.

It was formerly the custom for physicians to prepare their own prescriptions, and they had, therefore, generally a dispensary connected with their office. The principal business in the drug stores was in crude drugs, and in ready-made pills and other articles, such as are kept in the drug stores of this country. They did not do a prescription business.

About the year 1437, Japan was first visited by the Spanish and Portuguese, and from that time there has been more or less commerce with foreign countries. European drugs were thus introduced, among other things, but our people were comparatively ignorant about their use. In 1590, if I remember rightly the date, our government interdicted commerce with foreigners, except the Hollanders, and for them only one port, Nagasaki, was opened. Here they were permitted to reside, and they brought with them whatever was used in their own country. Through them our people were instructed in European medicine, and became acquainted with foreign drugs and chemicals. From the Portuguese and Spanish we had not gained European ideas to any great extent, since their relations had never been so intimate with our people.

In 1834 Commodore Perry visited Japan, and secured a treaty by which Japanese ports were opened to Americans, and from that time our people have been more and more inclined to adopt the ideas of foreigners. Schools have been established for instruction in foreign learning. About twenty-two years ago, a medical school was established in which medicine was taught according to English ideas. Previous to this there had been many private medical schools taught by Japanese who had been instructed by the Hollanders.

In later years, our people have learned that the Germans are more advanced in medical learning than the English, and we have sent to Germany for our teachers of medicine. A preparatory school was therefore established by the government, in which students were taught the German language so that they might be able to understand the lectures in German, and use German text-books. After a four years' course in this school, the students were admitted into the medical school. It thus required seven years to acquire a knowledge of medicine. Some of the students were supported by government, others studied at private expense. According to the German professors, these students showed as much ability as those of the German schools, in Berlin and other places.

Students are also taught in their own language, the course occupying five years. Many thousands of students have been graduated thus. In 1884, there were 168 students pursuing the German medical course, and 627 studying in Japanese ; in pharmacy there were 67 students. The pharmaceutical department was established twenty years ago, but there have been comparatively few students, for the reason that physicians have been in the habit of dispensing their own medicines. The number of students is, however, increasing, as the utility of a separation of the practice of pharmacy from that of medicine begins to be understood.

Instruction in pharmacy is given also in German as well as in Japanese. The German course requires six years, the Japanese three for graduation.

According to the government report there were in 1884 in Japan 632 hospitals, of which ten were government hospitals, 357 public and 265 private hospitals. These include seven hospitals for the insane, three for lepers, eight for eye troubles, four for beri beri, 125 for syphilitics, two for surgical cases. There are now thirty-five medical schools in Japan ; of these I cannot give any exact statistics.*

The number of practising physicians in the country is 39,708. Of these 32,374 have passed the examinations required before local boards, or were practising prior to the enactment of the law requiring such examination ; 584 are graduates of the Medical Department of Tokio University, or of medical schools in Germany, England or the United States ; 2974 have passed examinations of the Bureau of Health of the Home Department, while 3776 belong to the old school of Chinese practice, and have passed no examinations.

Of specialists, there are 288 surgeons, 510 obstetricians, 131 who practise oral surgery, and 644 oculists. Besides these there are 19,249 female midwives, and 4405 veterinary surgeons.

The number of apothecaries in Japan in 1884 was 8428. Of these 333 have passed the examination of the Board of Health of the Home Department, which includes arithmetic, natural philosophy, chemistry, elements of botany, pharmacy, and prescription writing.

The New Japanese Pharmacopœia.

In the year 1880, the Japanese Government gave an order to the Sanitary Bureau of the Home Department to have prepared a Japanese Pharmacopœia, and appointed a committee to carry out the publication of the work. This committee numbered seventeen members selected from the Medical Department of the University, the Military and Naval Hospitals, the Sanitary Laboratory of the Bureau of the Home Department, from physicians practising in Tokio, and from foreigners in the employ of the Japanese Government.

At the first meeting of the committee, held at the rooms of the Sanitary Bureau, the following subjects were discussed :—

1. General principles to be adopted in carrying out the work. 2. The remedies which should be included in the new Pharmacopœia. These points being decided, the work was placed in the hands of a sub-committee. It was thought best to compile the Pharmacopœia in the first instance in the German language, with which they were especially familiar. The work was afterwards translated into Japanese. In selecting the official Japanese names—a task of no little difficulty—the entire original committee took a share.

After the translation was completed, the work was revised by sub-committees appointed for that purpose, and finally submitted to the general committee for their approval. It underwent a further critical revision, in which the three government laboratories were invited to assist, in order that the analytical reactions, tests, and volumetric solutions might be verified. The work in its completed condition was finally published in June, 1886.

In compiling the Japanese Pharmacopœia, the German, British and United States Pharmacopœias were all consulted. The German was perhaps more closely followed than any other.

* In the military hospitals the surgeons are instructed in the German system, and nearly all speak German. In the naval hospitals, the English system is followed, and most of the surgeons speak English.

The new Pharmacopœia contains 475 articles, nearly all of which are official in the Pharmacopœias of Germany, the United States, and Great Britain. The Japanese version is to be considered the official text. The articles are arranged in alphabetical order, however, in accordance with the Latin name, as in the Pharmacepœias just mentioned. Under the title of each article is given a description of its physical properties, with the mode of preparation, and tests for purity. The metric system is adopted for absolute weights, and all formulæ are constructed in parts by weight. The work has also an appendix, giving lists of dangerous and powerful remedies, doses, solubilities, etc.

Among the foreigners who took prominent part in the work were A. S. C. Geerts (Dutch), Director in the Yokohama Laboratory of the Sanitary Bureau, who died in 1883, having been more than ten years a resident in Japan ; Dr. Eykman (English), Professor in the Pharmaceutical Department of Tokio University, who left Japan in 1885 ; Dr. Eldridge (American), Director in Yokohama Hospital, and still a resident at Yokohama, Dr. Langgard and Dr. Van der Hayden.

The new Pharmacopœia will give our physicians an authoritative standard. Heretofore those who have studied the German system have used the German Pharmacopœia, while those who have studied the English system have, naturally, used the British Pharmacopœia, and much confusion has resulted, since these Pharmacopœias differ in many particulars.

How generally the new Pharmacopœia is now used, I cannot say from observation, for I left Japan before it was published, but since it is our only authoritative standard, I infer that it is as generally used as is the U.S. Pharmacopœia in this country.

As I have already explained, the compounding prescriptions is not as yet done to any great extent in the drug stores of Japan. Physicians have always assistants and private students who are expected to put up their prescriptions. The assistants are graduates in medicine. They aid the physicians in examining patients, and in giving instruction to the private students, and generally superintend the preparation of the medicines prescribed. The private students are generally those too poor to take a regular course of medical study in the schools. The physician furnishes them room and board, and engages to instruct them in medicine. In return they do the work connected with compounding medicines, such as washing bottles, making pills, ointments, writing labels, etc. They learn also to write prescriptions. In the evening they have their time generally for study. These private students become physicians after they have finished their studies in the doctor's home, and passed the examinations of the Sanitary Bureau of the Home Department.

Of course it is only the more advanced students who are allowed to put up the physician's prescriptions. The more celebrated physicians keep two to five assistants, and ten to twenty private students. The doctors generally have one assistant and three or four students. Even in the country this is still the prevailing custom. It is probable, however, that it will be abandoned before very long. Laws will probably be made requiring that those who compound prescriptions shall have a special education, and the work of the pharmacist will be separated from that of the physician, as is the European and American practice.

SOME CONSTITUENTS OF YERBA SANTA.*

BY R. ROTHER.

A syrup prepared from Eriodictyon leaves is extensively used for the administration of quinine in a bitterless form. It also affords the further advantage of extinguishing the bitter taste of quinine when taken immediately after the use of mixtures in which it would otherwise be chemically incompatible. In order to disguise the bitterness of quinine when given in a fluid state, it has been variously exhibited in the condition of insoluble salts. The great objection to this mode of procedure is that these quinium compounds remain partially insoluble, and hence inoperative, in both alkaline and acidine contacts. Some of these combinations, although remarkably insoluble in the main, are by no means destitute of the nauseous bitter taint.

The important advantage possessed by *Yerba Santa* consists not only in the phenomenal suppression of the bitterness of quinine, but also in its presentation in a readily assimilable state.

A certain resinous component of Eriodictyon leaves is characterized by the property of forming in contact with some bases very soluble seemingly saline compacts. These, when merged with quinium salts, generate by double decomposition an ordinarily insoluble quinium-resin salt. This compound is promptly decomposed by the stronger acids, and is peculiarly soluble in ammonia.

When coarsely ground Eriodictyon leaves are percolated with water, a moderately dark brown coloured and somewhat bitter percolate is obtained. On evaporating this to a syrupy consistence and treating this residue with alcohol, a light brown liquor and dark brown pasty residue results. The alcoholic solution has acquired all of the peculiar bitterness of the percolate whilst the pasty mass is practically tasteless. On treating this residue, or the original one resulting from the percolate, with potassium carbonate, an ammoniacal odour becomes quite pronounced. The addition of an acid to the dark brown mass, separated by alcohol, yields a profuse precipitate which is wholly, but slowly, dissolved to a dark brown solution by a large volume of water.

When the residuary leaves in the percolator are treated with water rendered strongly alkaline with ammonia, the first portion of the new percolate is very turbid, but becomes clear as the free ammonia descends into the precipitate. A considerable proportion of alkaline menstruum is needed to extract the colour-giving substance wholly. Evaporation of the percolate to a syrupy residue and treatment of this with alcohol, yields a brown-red bitter solution, and a profuse dark brown precipitate. The solution and precipitate are in all respects identical to those obtained in the first percolation.

The alcoholic solution contains the quinine precipitant in union with ammonia as an acidic salt. The addition of water causes a dense milkiness, and acidulation with a strong acid precipitates the acidic resin in curdy flakes. Excess of ammonia added to the alcoholic solution causes no precipitate, but the colour is very perceptibly deepened. On exposure of this mixture the excess of ammonia and much of the alcohol is dissipated, whilst a red-brown tarry acidic ammonium salt deposits.

The precipitate given by alcohol appears to be an acidic ammonium salt of the tasteless and non-quinine precipitating acidic component of the leaves. When treated with water an inconsiderable proportion dissolves, leaving a large residue. Addition of ammonia or potassium carbonate and much water dissolves this wholly to a deep red-brown solution. The tinctorial power of this body is its most remarkable property. In its natural condition it is very probably in great part an acidic anhydrate, which is dissolved by aqueous solutions of alkalies and their carbonates. Under these circumstances no perceptible effervescence occurs when carbonates are employed.

With the use of monocarbonates the solution contains bicarbonate, showing that the reaction is like to that resulting in similar cases with analogous matter from other plants. On adding ferric chloride to such a solution, no precipitate at first appears. The continued addition of it, however, causes an abundant

* From the *American Journal of Pharmacy*, May.

brown-black precipitate soluble to a great extent in an excess of the reagent. It is also partially soluble in ammonia with a deep red-brown colour. The addition of ammonia to a mixture containing excess of ferric chloride gives a precipitate utterly insoluble in ammonia. These results show that the various proportions of the tinctorial body appended to basic radicles determine the degree of solubility and insolubility of the compound. As already stated, strong acids occasion a precipitate when added to alkaline solutions of this substance. Boiling of the mixture with dilute sulphuric acid appears to generate a new insoluble substance readily soluble in alcohol and in ammonia, with intense red-brown colour. The solutions are characteristically tasteless.

The tarry acidic ammonium salt of the quinine precipitant is readily and perfectly soluble in a sufficiency of alcohol. It is also readily and completely soluble in excess of ammonia. When treated with ether, a portion of the acidic component is dissolved. A correspondingly less acidic salt, however, remains undissolved. The action of chloroform is precisely similar in this. The acidic resin thus separated has an all-proportional solubility in these menstrua. It remains as a green-yellow transparent mass after the spontaneous volatilization of the respective solvents. It reacts with monad monocarbonates, converting them into bicarbonates. It is readily soluble in bicarbonates, evolving no carbonic anhydrate except on heating. When the solution obtained with sodium bicarbonate, for instance, is evaporated, a portion of the resin separates and is readily taken up by ether or chloroform. Alcohol however, dissolves an acidic sodium salt of the resin.

Treatment of Eriodictyon leaves with alcohol, dilute or strong, wholly removes the quinine precipitant. But this method of isolating it is neither economical nor practical.

A fluid extract of *Yerba santa* limpidly miscible with simple syrup is a desideratum. The writer has heretofore employed ammonia as a part menstruum in preparing syrup of *Yerba santa*. In order to secure an effective extraction an excess of ammonia is essential. It is difficult, however, to adjust a proper proportion, and hence the ammonia may preponderate in the finished syrup.

The writer would suggest a fluid extract of *Yerba santa* for preparing the syrup to be used in the proportion of 1 fluid ounce for 1 pint of the syrup. This fluid extract is merely an alcoholic solution of normal potassium eriodictyonate uncontaminated by the dark coloured non-quinine precipitant. The following is the process recommended :—

	Troy ounces.
Yerba santa leaves, coarsely ground . . .	16
Potassium carbonate	3
Ammonia water.	
Alcohol.	
Water. Of each sufficient to make one pint.	

Mix ammonia water and water in the proportion of one measure of the first and seven measures of the second. Mix the *Yerba santa* with 8 fluid ounces of this mixture and pack it firmly into a cylindrical glass percolator. After due maceration pour on menstruum until 3 pints of percolate has slowly passed. To this add the potassium carbonate and evaporate it until a pasty residue is left. Stir this well with 8 fluid ounces of alcohol, gradually added; let the pasty precipitate subside and decant the supernatant liquor. To the residue gradually add 8 fluid ounces of alcohol, as before, pour this mixture upon a strainer and force the liquid out. Should this second extraction measure more than is needed to complete the intended volume of fluid extract, dissipate the excess of alcohol by appropriate means; unite the residue with the first extraction, set the mixture aside for twenty-four hours, and decant the clear fluid extract from the scant crystalline deposit meanwhile formed.

LOBELIA INFLATA.*

BY J. U. AND C. G. LLOYD.

Description of the Drug.—In commerce two products of the plant are found, the entire dried herb and the dried seed. The former only is officinal, but the seed is a distinct article of trade, and very largely used.†

Lobelia Herb.—As found in commerce this drug consists of the stems, leaves and inflated capsules of *Lobelia inflata*. Usually the plant is gathered after the lower leaves have changed to brown, and after the seeds have fallen from the lower capsules, which are then also brown. The plant is cut off just above the ground, and the lower portion of the stem is generally devoid of leaves even in the carefully selected recent drug. Sometimes the plant has been known to appear so abundantly over an old field as to permit of its being mown with a scythe,‡ then the drug consists of straight, few branched stalks, from 6 to 24 inches long. If culled from moist situations along the banks of streams, the plants are more robust, branched and bushy.

Farmers often gather little lots of lobelia, and then the entire plant is sold. Root and herb collectors, on the contrary, understand that the seed commands a better price than the herb, and they thresh out the seed, break or chop up the stalk, and sell the seed separately. Thus it happens that the larger part of the lobelia herb of commerce is devoid of seeds, and is in a broken condition. As a rule, the leaves and capsules are of a green colour, the upper capsules being especially verdant.

No substitution for *Lobelia inflata* herb or adulterant is gathered, of which we are aware, nor is any probable. *Lobelia cardinalis* and *Lobelia syphilitica* are such different appearing plants they would be easily detected, and the other native and more closely allied species are so small and mostly rare that it would not be profitable to collect them.

According to the 'Pharmacographia' the drug used in England is mostly imported packed in ounces.§

Some writers assert that the root of *Lobelia inflata* is employed. This is a mistake, and first made by confusing *Lobelia syphilitica* with this plant. The root of *Lobelia syphilitica* was employed before *Lobelia inflata* was known to medicine, but the root of *Lobelia inflata* has never been used.

All parts of *Lobelia inflata* contain an acrid alkaloid which produces a painful irritation upon inhaling the dust of any portion of the plant. All parts of the herb, and the seed, produce an acrid biting sensation on the tongue, and a sharp tobacco-like impression in the throat and fauces. The milky juice of the green plant is intensely acrid, owing perhaps to the more soluble condition of the alkaloid. This juice is so violent that an amount so small as to refuse to affect a balance sensible to the one-thousandth part of a grain, produces a sharp tingling sensation upon the tip of the tongue. Upon drying, this juice becomes very much modified, but not by the escape of a volatile alkaloid.

The first published description of *Lobelia inflata*‖ states that the leaves if chewed "produce giddiness and pain of the head, with a trembling agitation of the whole body," and this sentence, with little variation, has passed

* Extract from the article on *Lobelia inflata* in the 'Drugs and Medicines of North America.'

† The powdered herb was known to Thomsonians as *green* lobelia. The powdered seed as *brown* lobelia.

‡ Professor A. J. Howe relates to us an instance in which several tons were cut at one time from an old wheat field about a mile from Worcester, Mass., on the road to New Worcester.

§ "The herb found in commerce is in the form of rectangular cakes, 1 to 1¾ inches thick, consisting of the yellowish-green chopped herb, compressed, as it would seem, while still moist, and afterwards neatly trimmed. The cakes arrive wrapped in paper, sealed up and bearing the label of some American druggist or herb-grower."—'Pharmacographia,' 1879, p. 399.

‖ 'Account of Indigenous Vegetables.'—Cutler, 1785.

through a multitude of works on materia medica.* It has not been our experience to note a giddiness of the head, the sensation with us is simply a tobacco-like irritation until nausea, headache and vomiting occur, and this is the report of others, who we know to be familiar with the drug.

Lobelia Seed.—This drug presents a deep brown colour in mass. It consists of minute, almost microscopic seed. Their actual size is about $\frac{1}{60}$ of an inch in length by $\frac{1}{240}$ of an inch in diameter. The typical seed is oblong, rounding at the ends, and cylindrical. Sometimes they are nearly round, however. The average number of seeds in a capsule is between 450 and 500. It requires 2500 seed to make 1 grain in weight.† Upon microscopic examination, each seed is shown to be a beautiful object, bright and glistening, the surface being a corrugated ridge-like network.

Lobelia seeds are odourless, but upon handling them a fine dust rises that is very irritating when inhaled. They possess the acridity of the plant in an intensified degree, and were considered by the Thomsonians to possess one-half more strength (emetic) than the powdered leaves.

Lobelia seed have never been officinal, but are in good demand in the American drug market, and extensively employed by Eclectic physicians who consider that the preparations of the seed are more uniform and reliable than those of the herb. Our experience is to the same effect.

No adulterations or sophistications are known to us, although often fragments of the leaves and capsules are present, not being separated by sifting through fine enough sieves. The commercial term for the drug free from this chaff is "clean lobelia seed."

The corrugated surface of the seed is a characteristic of the species of lobelia, and would serve to individualize them. It would be possible to substitute the seed of other species, *Lobelia syphilitica*, and perhaps *Lobelia cardinalis*. We made a careful comparison under a microscope of the seed of *Lobelia syphilitica* and *Lobelia inflata* and were unable to note any difference either of size or marking.

We are not aware that the substitution is ever made by collectors, but it could be done with profit to them as the *Lobelia syphilitica* produces seed in abundance and is a common plant and easily collected.

Fortunately, however, the plants are so different in all appearances that ignorant collectors have no idea that they are at all similar and the substitution is not suggested to them.

Constituents.—*Lobeline.*—The characteristic principle of *Lobelia inflata* is an acrid, irritating alkaloid, that pervades all parts of the plant; most easily obtained from the seed. It is known as lobeline.

It exists in combination with an unimportant vegetable acid. If freed while in contact with other constituents of the plant the alkaloid decomposes in a short time. If heat is applied to an aqueous solution of the natural constituents, this decomposition occurs rapidly and the alkaloid soon disappears.‡ Heat applied even to an alcoholic tincture accomplishes the rapid destruction of the alkaloid.

In a recent experiment whereby we evaporated in a close still the alcoholic tincture of fifty pounds of lobelia seed, and extracted the residue with acidulated water, having neglected to add the acid to the alcohol, most of the lobeline perished. In another experiment, by an oversight, heat was applied to an aqueous solution of the alkaloid, while it was associated with other constituents of the plant, and the alkaloid entirely disappeared.*

Although much time and attention have been given to the lobelia constituents, the result is far from satisfactory. In our opinion, the chemistry of the subject is yet obscure. We have followed the various processes and obtained the acrid alkaloid, amorphous, colourless, intensely active, one drop of its solution immediately vomiting a strong man, but we have not crystallized either the pure alkaloid or a salt of it. We obtained crystals from the impure alkaloid *lobeline*, as others had and for some time accepted that they were the corresponding salts, but further (recent) examinations enabled us to eliminate the crystalline material entirely, leaving the alkaloid as an amorphous product.† That we were for a while deceived is evident, that others may also have been misled is possible. For the present we shall simply call this crystalline substance *inflatin*,‡ and are led to make this introduction before referring to the preparation of lobeline.

(*To be continued.*)

* The original description of a drug seems to be authority with many writers who neglect to give proper credit to the real author, and, who seem not to display much personal knowledge of the subject.

† Thus, a pound will contain 17,500,000 seed. The business firm with which the writers are connected purchased recently, in one lot, 2000 pounds of lobelia seed. By our calculation this amount contains the enormous number of 35,000,000,000 individual seed.

‡ This fact was well known to the Thomsonians. They used but little heat, and throughout their literature we find constant reference to the loss of strength by boiling. Indeed, they wisely preferred to give both the herb and seed *in substance*. Empiricism demonstrated what chemistry supports.

* Here again the Thomsonians learned from experience. They used *acetic acid* to make their most stable preparations.

† We simply state that *we* were misled. The crystals that we obtained were not of lobeline, but an impurity that intimately accompanies it and crystallizes more easily under the influence of acid liquids. Our crystals compare, too, with Procter's description.

‡ We dislike to affix a name to a body that is so obscure in its classification as this now is. We find also that the various forms of the word *lobelia* are entirely monopolized. Hence, we reluctantly select *inflatin* for want of a better name.

CHEMISTRY OF GERMINATION.

In a work on this subject (*Les phénomènes chimiques de la germination*, Brussels, 1886), M. A. Jorissen states that the greater part of the nitrogenous substances formed in germination are derivatives of the albuminoids. The result of germination is not always a reducing process. The chief constituents of ash are phosphoric acid, potassa, magnesia, and lime. During germination a transport takes place of these substances from the cotyledons or endosperm to the embryo, the substances thus transported being chiefly phosphoric acid, potassa, and magnesia; the proportion of dissolved mineral substances is inverse to the advance of growth.

The author regards the transformation of starch into sugar as a purely chemical change independent of any micro-organisms, it is brought about by diastase even in the presence of the most powerful antiseptics. Seeds can, therefore, germinate without the assistance of these organisms. Ammonia salts are, he states, formed on germination. Experiments were tried on the formation of solanine and solanidine in the potato, to determine whether they are produced in germination. He finds that they are not reserve-substances, but a diffusible form of compounds of nitrogen. Amygdalin is also a plastic substance, and not a simple product of metastasis. It disappears only slowly on germination.

According to the author's observations, starch-grains may resist for months the action of diastase alone; in the rapid formation and transformation of the carbohydrates during germination, he believes the albuminoids to play an important part; and that they are derivatives of a simpler substance, formic aldehyde. Calcium is found universally in the cell-wall, and is probably essential to the formation of cellulose. The fatty acids are formed at the expense of the albuminoids independently of glycerin; on germination the fatty oils are split up into glycerin and a fatty acid. Sugar is not the invariable form assumed by carbohydrates during transport; it is not present in seedling hemp, nor in the epithelium of the scutellum of grasses.

The Pharmaceutical Journal.

SATURDAY, JUNE 18, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

"AMORPHOUS COCAINE."

THE increasing use of cocaine, not only as a local anæsthetic, but also for other purposes, and the very marked dissimilarity of many of the preparations of this alkaloid, as met with in commerce, appear to require a somewhat more precise definition of its characters than has yet been given with any degree of authority. It is still an open question whether the amorphous substance frequently associated with crystallizable cocaine and its salts really possesses the anæsthetic property of the pure alkaloid, or if it does so, whether it does not at the same time produce other objectionable effects. Certainly, the difference between these substances is in many respects very considerable, and sufficient to call for careful inquiry into their physiological actions. In the paper recently contributed to this Journal by Dr. STOCKMAN, the peculiarity of what is termed amorphous cocaine was attributed to the solubility of the crystallizable alkaloid in hygrine, another basic substance said to be naturally associated with cocaine in coca leaves. This opinion has been arrived at by Dr. STOCKMAN from a study of the physiological action and chemical relations of what is termed amorphous cocaine, but he gives no account of the experimental grounds upon which the opinion is based. So far as anything is known of the basic substance said to be associated with cocaine in coca leaves there appears to be strong reason for doubting whether Dr. STOCKMAN's opinion can be accepted as furnishing a satisfactory explanation of the amorphous and uncrystallizable character of a great part of the cocaine and cocaine salts met with in commerce. Taking the accounts given of hygrine by WÖHLER and by LOSSEN it must not be overlooked that both these authorities speak of it as being volatilizable. In this respect there is a marked difference from the substance known as amorphous cocaine, which is not volatile, but remains as a syrupy mass when its solution is evaporated. If this substance were really a solution of cocaine in hygrine the probability is that the hygrine might be evaporated off, leaving the cocaine in a crystallizable state. But this is not the case, and it appears more reasonable to infer that amorphous cocaine is a substance quite distinct from the crystallizable base.

In reference to this subject we have recently received a letter from Dr. W. MERCK, in which he states that his experience in working with cocaine does not agree with the opinion put forward by Dr. STOCKMAN, and so far as hygrine is concerned he regards it as being a purely imaginary substance. When investigating the subject he considered it to be of especial importance to repeat LOSSEN'S experiments, with the view of obtaining hygrine and ascertaining its properties and composition; but, as he states in his letter, all attempts to do so proved fruitless, and he could never obtain from cocoa leaves by distillation any product that could be regarded as an alkaloid. We are in a position to add that this has also been the experience of other operators, and it seems clear that before Dr. STOCKMAN'S suggested explanation of the nature of amorphous cocaine can be accepted the existence of hygrine must be established, and its capability of dissolving crystallizable cocaine demonstrated. Meanwhile it is necessary to regard the amorphous substance as being distinct from cocaine, and there appears also to be sufficient reason for excluding it from use for many of the purposes to which cocaine is applied. The irritation produced when the amorphous substance is applied to the eye, and sometimes resulting in ulceration of the cornea, is in itself strong evidence of the desirability of using only pure preparations of cocaine for such purposes, whether these effects be due to the presence of hygrine or not.

From what has been said it will be evident that there is a need of some ready means of testing the purity of cocaine salts capable of giving an indication more conclusive than that afforded by their mere appearance. For this purpose there is probably no more simple test than that proposed by Mr. MACLAGAN, and described in the "Month" of last February. It consists in dissolving one grain of the hydrochlorate in two ounces of water, adding two drops of ammonia solution and stirring the liquid with a glass rod so as to rub the sides and bottom of the glass. With a good sample of the salt well marked striæ will be at once formed where the rod has touched the sides of the glass, and very soon afterwards a copious crystalline precipitate will be deposited, leaving the liquid quite clear and bright. In applying this test to a sample of hydrochlorate containing the amorphous substance the solution becomes slightly milky, but no striæ are formed, and frequently no precipitate is separated, or if there be it is less copious than in the case of a pure sample, also less distinctly crystalline, and either ropy or at most of a flocculent character. In some instances no precipitate separates, but the liquid merely becomes milky, although the quantity of water used is only sufficient for retaining in solution four-tenths of a grain of true cocaine, or about half the quantity contained in one grain of the hydrochlorate.

"DRUMINE."

In "The Month" of December last, mention was made of the reported discovery of an alkaloid possessing anæsthetic properties analogous to those of cocaine. It was described as having been obtained from an Australian euphorbiaceous plant (*Euphorbia Drummondii*) by Dr. John Reid, of Melbourne, who stated that a 4 per cent. solution applied to the tongue or hand produced very marked local anæsthesia, and that when injected subcutaneously it acted as a pure sensory paralyser without preliminary excitement. The name of "drumine" was given to this substance by Dr. Reid. Subsequent it was tried physiologically by Dr. Ogston, of Aberdeen, who found that the material he had received from Dr. Reid in the form of a semi-crystalline waxy mass of a greyish-white colour had little if any effect as a local anæsthetic, and certainly could not be compared with cocaine in that respect. We learn that a similar result has been obtained with a sample of a solution supplied to Messrs. Savory and Moore by Dr. Reid last January. This was placed in the hand of Mr. W. H. H. Jessop, of the Royal Hospital for Diseases of the Chest, for trial of its effects when injected subcutaneously and when applied to the eye. In all instances the results were absolutely negative. Chemical examination also showed that the solution gave no indication of the presence of an alkaloid. In the present number of the Journal will be found a letter from Mr. Tanner, in which he gives the result of his examination of a substance supplied under the name of "drumine," but consisting mainly of calcium oxalate. It would appear, therefore, that whatever alkaloidal substance may exist in the plant operated upon by Dr. Reid, the method of extraction adopted by him has not been successful in obtaining it. The account he gives of that method, viz., maceration of the entire plant in hydrochloric acid and precipitation of the liquid with sodium bicarbonate shows that it might well furnish nothing more than calcium oxalate, and that as drumine is said to be soluble in water the whole of this might be lost in the mother liquors.

We are informed that it has been resolved unanimously by the Executive of the North British Branch to hold another election of the Executive at the earliest convenient date, for which purpose nomination papers will be sent out to the Members and Associates of the Society resident in Scotland immediately. It has also been resolved that in future the election shall take place annually in the month of June.

* * *

On Tuesday last, in the House of Commons, the adjourned debate on the motion to go into committee on the Pharmacy Acts Amendment Bill was further adjourned until Friday, the 24th inst.

* * *

Some little excitement seems to have been caused among the pharmacists of Italy by a recent decree of the Government. According to the present law a candidate for the pharmaceutical qualification in Italy must study three years at a university, in which, besides the ordinary chairs for natural sciences, there are two others for pharmacy and materia medica. During this time the examinations in the several sciences may be passed, and then, after one year's practical experience in a pharmacy, the candidate may go on to the final examination, which includes the carrying out of a qualitative analysis, the making of one chemical and one pharmaceutical preparation and discussion thereupon, pharmacognosy, pharmaceutical botany and dispensing. Between 1860 and 1867, during which years the Italian kingdom was being gradually constituted, many young men were interfered with in the progress of their studies, who at the close of the war were too old to go through the regular course, and moreover the pharmacists of the now united provinces had not been previous to the new law all under similar conditions. Accordingly, after the annexation of Venetia and the final unification, in 1867, a number of pharmacists were afforded an opportunity of acquiring a regular position at an extraordinary examination session. Considerable astonishment was excited, however, when ten years later, in 1877, a second extraordinary examination was held, though the passing of this did not legally qualify a person to become a proprietor of a pharmacy or dispense poisons. Dr. Hugo Schiff, who was on the Commission for Piedmont, says that many of the candidates were almost entirely without scientific knowledge, but that in some parts of the country an undesirable leniency was exercised, leading to the address to the Government of a protest against the repetition of these opportunities for avoiding the usual course. The issue of a decree fixing the date for a third special examination session for 1888 has, therefore, given rise to much dissatisfaction, and the executives of the pharmaceutical associations and schools throughout the country are exercising their influence to secure its withdrawal.

* * *

A correspondent to the *Lancet* states that within the last few days a number of children have been taken to the Royal Southern Hospital, Liverpool, suffering from symptoms of poisoning consequent upon eating some "nuts" which they found in a heap of rubbish. The supposed "nuts" are said to have been croton seeds.

* * *

In discussing, in an annual report just published, the position of the rival processes of alkali manufacture, the Chief Inspector of Alkali Works says that in Lancashire the Leblanc process holds its own, and has even advanced, in spite of the continued development of the ammonia soda process. In the Newcastle district, however, the amount of alkali manufactured according to the Leblanc process has diminished, and taking the whole country the amount of salt decomposed last year in Great Britain in the older way is estimated to have been 649,248 tons, against 664,551 tons in 1885. The amount of alkali made by the ammonia process has steadily increased, and now reaches 95,000 tons of carbonate of soda annually. The 137,220 tons of salt thus used added to the quantity decomposed by the Leblanc process gives a total of 786,468 tons, the highest amount that has yet been reached.

* * *

Is is also stated on the authority of the Inspector of Alkali Works that out of the 100,000 tons or more of sulphate of ammonia produced annually in this

country, chiefly from the ammoniacal liquor of gas works, only one-fifth is retained for home use for all agricultural and chemical purposes, the remainder being exported, chiefly to Germany. A hope is expressed that British farmers may soon learn the manurial value of this compound, which, being produced at the gasworks scattered throughout the country, could as a rule be obtained by them practically free from the heavy charge for carriage involved before it can reach the German or Belgian farmer.

* * *

Some experiments carried out on a large scale at Messrs. Walker, Palmer and Co.'s lead works, in Flintshire, with a view to utilizing electric currents in causing the deposition of the particles suspended in the lead fume, in accordance with the suggestion of Professor Lodge (see vol. xvi., p. 1041), have not been attended with the hoped-for success. A large Wimshurst induction machine, with four glass discs of 5 feet diameter, was erected, and the currents of electricity were carried from it to two wire gratings inserted a few feet apart in the main flue, which were of the size of the sectional area of the flue. It was hoped that the electricity in traversing the space between the gratings would, in accordance with the results obtained by Professor Lodge in his preliminary experiments, cause the deposition of the dust or fume; but this deposition did not take place, although the cause of the failure remains at present unexplained.

* * *

We learn from the *Pharmaceutische Zeitung* that Dr. Theodor Peckolt, whose name will be familiar to our readers as the author of numerous valuable communications on Brazilian drugs, intended celebrating last week, in Rio, his fiftieth anniversary as an *apotheker*. Dr. Peckolt was born in 1822 at Christianstadt-am-Bober, in Prussian Silesia, and emigrated to Brazil in 1847.

* * *

The fifty-fifth annual meeting of the British Medical Association is to be held in Dublin on the 2nd, 3rd, 4th and 5th of August, the President-Elect being Dr. J. T. Banks, the Regius Professor of Physic in the University of Dublin. The Address in Medicine will be delivered by Dr. W. T. Gairdner, Professor of Medicine in the University of Glasgow; the Address in Surgery by Dr. E. Hamilton, Professor of Surgery in the Royal College of Surgeons in Ireland; and the Address in Public Medicine by the Rev. Dr. S. Haughton. The Section of Pharmacology and Therapeutics will be presided over by Dr. William Whitla. There will also be the "Annual Museum," which is to be held in the Anatomical Department of the Medical School of Trinity College, the Honorary Secretary to the Food and Drugs Section of which is Dr. F. J. B. Quinlan, 29, Lower Fitzwilliam Street, Dublin. The Committee charged with the arrangements of the Museum is anxious to allot the space at its disposal, and requests immediate application from intending exhibitors to the Local Honorary Secretary, Dr. George F. Duffey, 30, Fitzwilliam Place, Dublin.

* * *

The next meeting of the School of Pharmacy Students' Association will be held on Thursday, June 23, when the proceedings will include a note on a Specimen of Green Olive Oil by Mr. J. O. Braithwaite, and a Report on Pharmacology by Mr. R. A. Cripps.

Transactions of the Pharmaceutical Society.

ADDRESS TO THE QUEEN.

The following is a copy of the loyal and dutiful Address to Her Majesty the Queen on the completion of the fiftieth year of her reign, which has been drawn up and duly forwarded in compliance with the resolution passed by the Council of the Pharmaceutical Society at its last meeting:—

"*The Humble Address of the President, Vice-President, and Council of the Pharmaceutical Society of Great Britain.*

"To the Queen's most Excellent Majesty.

"May it please your Majesty,

"We, the President, Vice-President, and Council of the Pharmaceutical Society of Great Britain, approach your Majesty with feelings of loyal devotion to your august person and to your throne, to tender our sincere congratulations on the happy completion of the fiftieth year of your Majesty's reign.

"During that period Pharmacy and the kindred sciences promoted by your Majesty and his Royal Highness the late Prince Consort have made enormous strides. It is a source of peculiar gratification to us that our Society was one of the first founded during your Majesty's reign, its Charter having been granted in the year 1843, and the Acts of Parliament which confirmed the Charter and placed pharmacy on a definite legal basis having been passed also during your Majesty's reign.

"We humbly pray that your Majesty may long be spared to reign over a happy, loyal, prosperous and united empire, beloved by all your subjects.

The Common Seal of the Pharmaceutical Society of Great Britain.

Seal.

"Michael Carteighe, *President.*
"Thomas Preston Gostling, *Vice-President.*
"John Robbins, *Treasurer.*
"Richard Bremridge, *Secretary and Registrar.*"

Provincial Transactions.

BRIGHTON ASSOCIATION OF PHARMACY.

The first annual dinner of the Brighton Association of Pharmacy took place on Thursday, June 9, and was well attended by members and friends. The chair was taken by Mr. W. D. Savage, J.P., and after letters had been read from Mr. Carteighe, Dr. Paul, Dr. Hodson and others, regretting their inability to attend, the Chairman proposed the usual loyal toasts, which were heartily received.

Mr. Cornish (in the absence of Mr. T. Billing) proposed the toast of "The Medical Profession," and paid a warm tribute to the high character, both scientifically and morally, of the members of the medical profession. He expressed his belief that the medical profession in England stood as high as in any part of the world, and that chemists being prepared by their education and aptness in their calling to be a helpmeet to medical men in the beneficent work of ameliorating the condition of suffering humanity, were daily rendering essential service to the medical profession. As a body, chemists always felt a warm attachment to the medical profession.

Dr. Ewart, in responding, said that the medical pro-

fession was world-wide in its diffusion. It had been said "You will find a crow, a sparrow and a Scotchman wherever you go," and according to his experience, it might be added, "an Anglo-Saxon doctor;" for whether in Afghanistan, in India or China, or wherever you go, an English, Scotch or Irish doctor has always gained a very substantial footing. There was a self-sustaining power in the profession—a power to make itself felt. It filled a very important sphere in civilization. It was a humanizing profession, and perhaps no other profession did so much eleemosynary work. The medical profession regarded chemists as really and virtually a complementary part of the profession, for it was to them that medical men looked to have their prescriptions honoured, not in the breach but in the observance, and that they were honoured was proved by the fewness of the complaints made. Sir W. Gull had recently said that medicine was not much good, but he thought that Sir W. Gull had not reflected that the English people were the most healthy, energetic and robust people in the world, and at the same time the largest medicine takers. The medical profession was a humanizing profession, and more than that it was liberal to a degree, the republic of medicine was less contracted and restricted than other professions. It was liberal in promoting one great department which was calculated to diminish its profits, the department of sanitation. In consequence of sanitary improvements the nation would become healthy, wealthy and wise. He felt honoured by the invitation to the dinner; medical men liked to meet those with whom they were in professional contact, and next to patients there was no class they were in more frequent contact with than chemists, for whom personally he had the very highest esteem. Chemists were a real assistance to medical men in modifying the pains and pangs of suffering humanity.

Mr. Alderman Cox, J.P., next proposed the toast, "The Pharmaceutical Society," and said it would be acceptable to all, as all were indebted to that body The Pharmaceutical Society had been established to give a better education to those who entered the calling, and to raise chemists from being mere tradesmen to something like a professional status, and this had been accomplished. Commenting on the Benevolent Fund, Mr. Alderman Cox said he thought that nothing could be more kind and generous than for chemists to provide out of their meagre profits for the unfortunate ones in their calling, and that it was very creditable that over £17,000 should have been distributed to deserving persons during the past ten years. He thought there was no better way of commemorating the Jubilee than that proposed by the Pharmaceutical Council, to give an additional £5 to all annuitants.

Mr. Cortis (Local Secretary at Worthing) responded, and endorsed all that had been said on behalf of the Society, and as one who had received his professional education in the School of the Society he had every reason to speak well of it; it had been of very great service to him and to a great many others.

Dr. E. G. Whittle next proposed "The Brighton Association of Pharmacy," and expressed his pleasure at being present and his best wishes for the Association. Dr. Whittle then proceeded to indicate questions which might be discussed at meetings of the Association. He believed that medical men would find it to their best interests not to dispense even for minor ailments, and chemists would be well advised not to prescribe. He suggested that dispensing should be done on special terms for clubs, and for family practice; a prescription from a consulting physician should be charged at a higher rate than one from a family medical man. He believed that chemists' charges were very fair and in some cases very low, considering that the payment was made for skill and education, and not based on the mere commercial value of the drugs.

Mr. W. D. Savage, J.P., responded, and after thanking thosepresent for their reception of the toast, gave a history of the Association from the year 1861, when the first Brighton Chemists' Association was founded, and told of various lectures and classes which had been started for apprentices and assistants, and which had not been valued as they deserved. He hoped the Bill now before Parliament for enforcing attendance at a series of lectures would become law.

Mr. T. H. Long proposed "The Visitors;" he hoped that the dinner would become an annual affair, and that more visitors would attend in future.

Dr. Ewart responded. Other toasts to Messrs Caton and Salmon, and to the Secretary (Mr. Marshall Leigh), followed, and a vote of thanks to the Chairman brought the meeting to a close. The meeting was enlivened by songs, recitations, etc., by Messrs. Long, Costerton and Leigh.

Proceedings of Scientific Societies.

SOCIETY OF CHEMICAL INDUSTRY.

Manufacture of Arrowroot Starch in St. Vincent.*

BY J. W. MACDONALD.

As we have lately been treated to a very interesting paper on starch manufacture from Indian corn, it was suggested to me that we might with advantage continue our discussions on this subject by learning something of its manufacture from another raw material, arrowroot, or, as it is known in botany, *Maranta Arundinacea*. This plant is essentially a starch-producing plant, the starch existing in it in almost absolute purity, and no other use having been found for it, as far as I am aware, excepting for feeding cattle. I have long felt, and this was also dwelt upon by our Chairman in his discussion on Dr. Archbold's paper, that it was a great waste of valuable nitrogenous matter to manufacture starch from such materials as maize, wheat, rice and potatoes, which in themselves form a large proportion of the food of man. We have around us large masses of half-fed human beings, nevertheless we daily destroy hundreds of tons of valuable food in the manufacture of starch, etc. I feel sure that as the world advances and becomes more populated, a more conserving spirit must pervade our manufactories, and only such raw materials be used as will cause the least waste of matter; countries, too, that are best suited by natural forces for the production of certain commodities, will have to carry out the intentions of nature. We shall not then have such anomalies as Europe trying, by the aid of Governments, to supply the world with sugar; for nature's sugar plant is the sugar cane, and its home, the tropics.

Arrowroot is also a native of the tropics. The island of St. Vincent in the West Indies has taken the foremost part in its growth and production; a fair quantity is also made in Natal, and smaller quantities in India, Fiji, Queensland and other countries. Formerly, the Bermuda Islands produced a good deal, but, as there is very little arable land and a scarcity of water, and the inhabitants having turned their attention to growing early vegetables for the New York markets, arrowroot is gradually being given up.

In St. Vincent the plant grows 2 to 3 feet high. It is a weak fibrous stalk with six to eight arrow-shaped leaves resembling the leaves of the lily. When the root is ripe, these leaves fall and wither. The plant flowers but does not bear seed, and is therefore propagated by the root. This can be done in two ways, either by pulling the green stalks, trimming off the long hairy roots, and setting them 6 inches apart in fields previously prepared for their reception, or, as is most generally done, by returning to the soil the upper end of the root, which

* Read before the Liverpool Section of the Society of Chemical Industry. From the Society's Journal.

is hard and fibrous, and contains very little starch. As the fields are dug up, the labourers pick out the roots and break off these top pieces 4 to 6 inches long, and bury them in holes 6 inches apart and a few inches deep. In this way reaping and planting go on simultaneously. Care must be taken, however, to avoid returning to the soil small thin weak roots. The roots commence to grow in about a fortnight, but, to avoid choking, the fields have to be weeded two or three times. In about ten to twelve months the roots are ripe, and are then 12 to 18 inches below the surface. If they are reaped before being properly ripe, the next crop suffers, and frequently takes fifteen months to mature, and the fields require to be frequently weeded. With careful attention and manuring fields will produce crops for over twenty years. The arrowroot is a very hardy plant, and will continue to grow up and die down for years after its cultivation has ceased in a field. The roots are long and tap-shaped, and are jointed at intervals of three-quarters to one inch. In the soil they are protected by a fibrous covering which grows from each joint, the folds overlapping each other to the end of the root. Full-grown roots are from 10 to 18 inches long, the most starch being found in the lower or youngest end.

The first part of the manufacturing process is to soak the roots in water to soften the covering and the adhering earth. They are then stripped of the covering and washed, and thrown into a second or rinsing tank. When thoroughly clean they are taken to the pulping machine. The skin is said to contain a resinous matter which gives a yellow tinge and unpleasant flavour to the starch, if the latter is not well washed. In former times the roots were very carefully skinned with German silver knives, before being pulped. This is said to have produced whiter starch, but as it was so laborious and expensive, it was discontinued. The skinned roots were pulped by subjecting them to great pressure by passing them through an upper, and then a lower and much closer, pair of polished brass rollers, to break the starch cells. The method of pulping now generally adopted is to feed the clean unskinned roots against a fine saw-grater very similar to a potato-grater. It is a solid cylinder of hard wood about 23 inches diameter and 7 inches wide. Slits are made by a saw from end to end of the wood at half-inch intervals. Saw blades having six to ten teeth to the inch are then fitted into the slits, and the whole immersed in water to swell the wood and fix the saws. The grater is now fitted into its place very close to a wooden feeding bed. As it revolves several hundred times per minute it tears the roots into shreds. A great deal, however, depends on the fineness of the teeth and the velocity of the drum.

On account of the very fibrous nature of the pulp there is considerable difficulty in the sieving or separating of the starch from it. The fibres readily gather into lumps and enclose the starch, so that hand sieving, although very tedious, has to be resorted to. The pulp is first run into a box or sieve, the bottom of which is a sheet of copper or tin punched with holes about one-fifth inch diameter. While water flows on, the contents are kept thoroughly agitated by hand, until all the starch has been washed out. While one strainer full is being washed, another is being filled so that there should be no delay. However careful one is there is a loss of starch in the fibre owing to the presence of small bits of the roots which have escaped pulping.

In one factory, instead of the above strainer a tin-lined copper cylinder has been tried. The cylinder was stationary, its under side being pierced with holes, and, inside, paddles or beaters revolved at great speed amongst the pulp and water, until the latter flowed away free from starch. The washed fibre was then removed and a fresh charge of pulp put in. This, however, has been discontinued. In another factory, a half cylinder, also stationary, is in course of erection. Its under side is also pierced with small holes, but there is a slide under this to open or close at will. Inside there are rakes attached to two shafts, which move in opposite directions and cause the rakes to oscillate very rapidly between each other, thereby keeping the fibre always open. The starch water is let out, more water run in, and the operation repeated until the starch has ceased; then the fibre is taken out. The great objection to any mechanical washer is the tendency of the fibre to accumulate on the agitators and break them. I do not know at present of a single mechanical washer being in use. To get over this difficulty it has been proposed to chop up or slice the roots into small short pieces, and either rasp them or pass them through metal rollers or mill-stones, so that the thin disintegrated pulp may flow over mechanical sieves. I do not know if this plan has yet been tried. Although causing a loss of starch, the present method of rasping avoids an undue pulverizing of the soft yellow fibre, and so gives a very white starch without much further trouble.

From the fibre strainers the starch water flows consecutively through a series of brass wire sieves of forty, eighty, and one hundred meshes; each of these retain small fleshy bits of unpulped root. From the last sieve the water runs into the settling cisterns, which are preferably lined with white glazed tiles to avoid accumulation of slime.

A portion of the fibre collected on the finer sieves is used for feeding the animals on the estate, the remainder and all the coarse fibre are used as manure. For this purpose it is left in heaps until it decomposes, after which it is distributed on the fields along with pen manure. Sometimes also ashes and guano are used. The waste water from washing the starch contains a considerable amount of vegetable matter, and gives good results where it is run on the fields, but the extensive application of this is not practicable. After the starch has settled in the cisterns the water is run off and more added, the whole is stirred up and again allowed to settle. This generally suffices to dissolve out soluble matters. At night all the cisterns are drained, and the starch is dug out and taken to a mixing box, where it is mixed with a small amount of water, then run through another fine sieve into the separating pans. These are small round galvanized cisterns with smooth perpendicular sides. When filled, the starch milk is stirred round with a small oar until it is in violent circulation. The oar is withdrawn and the cisterns left until morning. The stirring has the effect of separating the starch from any remaining impurities. These, being of less specific gravity, settle last and therefore on top of the starch. Next morning the water is drained off, and the light impure starch scraped off the surface. If the earlier parts of the process are carelessly done, this separation may have to be repeated before the starch is quite pure. The impure surface starch contains a large proportion of starch entangled in very fine particles of fibre and broken cell walls. Although this can be dried and exported as an inferior starch, it is generally given to the labourers as a perquisite. It is used in various forms as flour. Poultry and pigs are also fed with it. Weak caustic soda extracts a colouring matter from it, but also precipitates a yellow substance, making it very difficult to separate the starch from it in a pure state.

The pure starch in the separators is now taken out in blocks, and placed on trays for about twelve hours to drain and harden. It is then broken into smaller pieces, and taken to the drying house, where it is air-dried. This building is open on all sides for free circulation of air. It is surrounded, however, with galvanized wire to keep out the small birds which hover about. Inside there are a series of wire shelves over large shallow wooden trays. The top shelf is made of very open wire, the next is closer, and so on, the lowest being the closest. The wet lumps of starch are placed side by side on the top shelf, where they remain until by the action of the air they crack up and fall through on to the next shelf. In

time the whole falls through the lowest shelf, and is in a fine granular state, ready for packing. It contains from 14 to 17 per cent. of water. In cold wet weather the starch dries very slowly, taking sometimes as long as two weeks. During this time, if the starch has been imperfectly purified, the lumps get sour and become yellowish. Indeed, the whole process must be as rapid as possible. In the settling cisterns especially, if the starch is left in contact with the impure water too long, its whiteness is affected. The crop lasts from October to May. The name "arrowroot" is, I think, derived from the Indian word, Ara-ruta, or "mealy-root;" but some say that this root has been confounded with the *Maranta galanga*, which was called the arrowroot on account of its bruised roots being used as an antidote to the poison of the *Jatropha Manihot*, which was used for poisoning their arrows. I may say that tapioca starch is obtained from this poisonous root. The poison, however, is contained in the juice only, and is destroyed by heat.

Regarding the yield of arrowroot, an acre will produce 13,000 to 15,000 lb. of roots, according to the season ; in wet seasons the roots are heavy and moist, and give less starch. A fair average yield is 22 cwt. air-dried starch, with 14 per cent. water, per acre, or about 19 per cent. on good roots. I have no doubt that this will be considerably increased by the use of much-needed improved pulping and sieving machinery. The roots that I have analysed got slightly dried in transit, so that they show a rather high amount of starch. The analysis, however, will give an idea of the constituents of the roots. In some respects it differs from an analysis by Benzon, stated in Ure's Dictionary, and which I append:—

	J. W. M.	Benzon.
Starch	27·07	26·00
Fibre	2·82	6·00
Fat	0·26	0·07
Albumin.	1·56	1·58
Sugar, Gum, etc. . . .	4·10	0·60 (Gum)
Ash	1·23	0·25 ($CaCl_2$)
Water.	62·96	65·50
	100·00	100·00

The ash consisted of phosphate of lime and alkaline sulphates, and chlorides.

I have made an attempt to introduce the residual coarse fibre as a raw material for paper manufacture, but consumers say that it is too weak and lacking in tenacity. For paper making the starch still remaining could be recovered by steeping in boiling water, and used for sizing the finished paper.

Owing to the fall in the value of sugar, the production of arrowroot in the West Indies has been extended rather beyond the demand. The wholesale price has consequently fallen to an almost unremunerative point. This low price, however, will permit it to be used for whatever purposes the commoner kinds of starch are now employed. In some respects it is superior to common starch, and one of my chief objects in writing this paper is to draw the attention of large users of starch to this comparatively new source of very fine starch. Arrowroot swells much more readily, and with less heat than maize, rice or wheat starch, and forms a stiffer jelly. It is, therefore, highly adaptable for sizing and laundry purposes. I think this property is attributable to the larger size of the granules of arrowroot starch which are among the largest of the starch granules, whereas the granules of wheat, maize and rice starch are very small and will contain a greater proportion of starch cellulose and less granulose, the latter being the substance which swells when dissolved in hot water. Another use for which arrowroot starch is very suitable on account of its great purity and freedom from chemicals, is for the preparation of powder for the skin. Many of the powders sold are composed of very questionable ingredients: arrowroot well crushed and dried on a plate before the fire is both simple and safe.

It is as an article of food, however, that it has hitherto been mostly used, but the exorbitant retail price put on it (from 8*d.* to 2*s.* per lb.) has kept it out of general use. Of course, being starch it cannot have the flesh-forming power of flour and other nitrogenous meals, but it is the purest, most digestible and palatable of the starches, and is devoid of the unpleasant taste or flavour observed in potato starch and in the so-called cornflour and other starches extracted from the cereals by the caustic soda and fermentation processes.

Regarding adulteration, this is only done when the arrowroot is for sale at a high retail price for food. This is chiefly effected by such cheap starches as those from potato, sago and tapioca. I have also found chalk and plaster of Paris in arrowroot, but this is very rare. The microscope affords the only reliable means of detecting admixtures of starch, and as this is only within the reach of very few, admixtures often go on with impunity. I need not here enter into a description of the characteristics of various starch granules, for they are described in many well-known books. I find, however, that many of the prints given and the descriptions are very erroneous, so that one should resort more to personal observations, using samples of the various starches for comparisons, the origins of which have been carefully ascertained and noted. When examining a sample of unknown starch, a small portion from the standards should be mounted and compared in order to make sure of the origin of the unknown sample. If a thin well-washed section of the root be examined by the microscope, the arrangement of the cells is seen to be very perfect and beautiful, resembling somewhat a section of the honeycomb. The cells are hexagonal and very transparent, and are filled with very uniform starch granules. The pith of the root contains very small and somewhat irregular cells, which are filled with exceedingly small starch granules; this is probably the source of the smaller granules seen in a sample of arrowroot starch. The fibres are arranged in concentric rings round the pith. They are somewhat strong in the fleshy part of the root, but weak at the joints, which break very easily.

Regarding the annual production of arrowroot, I have not been able to obtain many statistics. Bermuda raises only 500 to 700 kegs, so that very little of what is sold as Bermuda really comes from there. Natal produces 2000 to 3000 cases, and St. Vincent about 22,000 brls., 20,000 of which come to England, and most of the remainder is sent to America. The production of other countries is, I believe, very small.

Analysis of Arrowroot Starch.

	Per cent.	Per cent.
Starch	83·70	99·5 when dry
Fibre.	0·04	0·05 „
Fat	0·07	0·08 „
Sugar, Gum, etc. . .	0·18	0·21 „
Ash and Sand. . .	0·14	0·16 „
Water	15·87	—
	100·00	100·00 „

Parliamentary and Law Proceedings.

The Question of Recovery for the Services of Unqualified Assistants.

HOWARTH *v.* BREARLEY.

On Saturday, the 11th inst., in the Queen's Bench Division of the High Court of Justice, before Lord Coleridge and Mr. Justice Denman, a case was heard

which raised a question of great importance to medical practitioners and also to the public, the question being whether unqualified persons can be employed by medical practitioners to supply medical attendance and medicines. The action in the Salford Court was by the assignee of one Fitzmaurice, a qualified medical practitioner at Bury, to recover from a person living at a village near that town a sum of £18 12*s.* for medical attendances and medicines for a period from 1880 to January last. It appeared that the actual attendances had been by an unqualified assistant of Fitzmaurice, and that he prescribed and made up the medicines, Fitzmaurice himself taking no part in the business. At the trial it was objected that under the 21 and 22 Vict., c. 90, the plaintiff could not recover as the attendances were by an unqualified person. And the Judge so thought and directed a nonsuit. This was an application by way of appeal from that decision.

Mr. Willes Chitty appeared for the plaintiff in support of his application for a new trial, and contended that in law the medical attendances were by the principal, who was a qualified practitioner, and not by his assistant.

Lord Coleridge: Then your contention comes to this—that a qualified medical practitioner may employ any number of unauthorized persons to administer medicines; and (to use an expression of Lord Ellenborough's) to make our stomachs the arena for the struggles of opposing poisons.

Mr. Willes Chitty: The principal was qualified.

Lord Coleridge: But the unqualified person prescribed, and that was the ground on which the Judge decided, viz, that the qualified person who sued had not attended or prescribed.

Mr. Willes Chitty: He had by his agent.

Lord Coleridge: Who was unqualified.

Mr. Willes Chitty: The medical man had a branch house at which his assistant attended.

Lord Coleridge: And he was unqualified; so that the qualified man did not attend, and the man who attended was unqualified. It is a very serious question. Patients have been killed by mistakes of unqualified persons. In one instance a person was killed by an assistant giving him 6 grains of strychnine instead of 6 grains of salicin, a rather serious mistake. One does not like the idea of one's life being terminated by such a mistake.

Mr. Willes Chitty: If this view is to prevail a doctor cannot keep a boy.

Mr. Justice Denman: Oh, yes he can; but he must not send his boy to attend his patients, feel their pulses, and prescribe for them. If you are right he may send his boy or his butler to attend them.

Mr. Willes Chitty: Business is constantly done by servants or agents.

Lord Coleridge: But the Act says that an unqualified person shall not recover for attendances or medicines. And here the qualified person did not attend or prescribe.

Mr. Willes Chitty: Not personally, it is true.

Lord Coleridge: And the Act says that an unqualified person shall not recover for attendances or medicines.

Mr. Willes Chitty: Here he is not suing; it is his employer, the qualified person, who is suing.

Lord Coleridge: And he did not attend or prescribe.

Mr. Willes Chitty: Not personally.

Lord Coleridge: How can a medical man attend or prescribe for a patient unless personally.

Mr. Willes Chitty: If the assistant were qualified that could not be set up.

Lord Coleridge: But there the Act operates, and says that the unqualified person shall not attend or prescribe.

Mr. Willes Chitty: Not so; the Act does not say that; it merely says that an unqualified person cannot recover for attendances; nor is he seeking to do so in this case; indeed he could not do so, for if he sued he would be met by the objection that he had attended the patient only as the servant of his employer, so he could not recover. There is nothing illegal in an unqualified person attending patients with a qualified person, only the unqualified person cannot recover for the attendances. That is the only effect of the Act.

Lord Coleridge: That view would defeat the whole object of the Act, which is to prevent unqualified persons from acting. To hold that they may act, and that, though they cannot recover, their employer, if qualified, may do so, would certainly defeat the very object of the Act.

Mr. Willes Chitty: No doubt it has been held that in order to recover it is necessary that the practitioner should have been qualified and registered at the time of the services rendered (Leman *v.* Houseley, 10 "Law Reports," Q.B., 66); but that does not touch the present question, for there the unqualified person was suing.

Lord Coleridge: But Lord Blackburn there said, "the object of the Act was clearly to prevent unqualified persons from practising," and that is obviously good sense.

Mr. Willes Chitty: There are other cases at variance with that view.

Lord Coleridge: If so, then I adopt the principle of the case just cited. The question is, were the services here rendered by the qualified person?

Mr. Willes Chitty: No doubt that is the question. But a medical man may render medical services by his assistant.

Lord Coleridge: Not so, legally, if his assistant is unqualified.

Mr. Justice Denman: The question is whether a qualified practitioner can recover for services he has not rendered, but only by an unqualified assistant.

Mr. Willes Chitty: That, no doubt, is the question; and why should he not recover for such services, just as a solicitor can recover for services rendered by his clerk?

Lord Coleridge: For clerk's work and only clerk's work.

Mr. C. A. Russell appeared on the other side, and contended that the plaintiff could not recover for the attendances. No doubt a medical man might to some extent carry on his business by unqualified assistants, but here the medical services sued for were rendered by an unqualified assistant, and not by his employer. The learned counsel was stopped, and

The Court proceeded to pronounce judgment against the plaintiff.

Lord Coleridge said the unqualified person had actually rendered the services, and the action was brought by his employer, no part of the services having been personally rendered by him—that is, not physically, for the services of a medical man were rather intellectual; and if the qualified practitioner, being at hand, really directed the attendances and the medicines, he might possibly recover for services thus rendered. But here the attendances were really by the unqualified person, and the Act said that no person should recover for medical services unless he was qualified and registered. In the present case the medical man whose representative sued had not himself rendered any medical services—that is, had not attended nor prescribed, and a medical man could not recover for attendance not really rendered by him. The Judge, therefore, was right in directing a nonsuit. There was no case which had established the contrary. But it had been held that an unqualified person could not sue his employer or his patients for attendances or medicines ("Alvarez de la Rosa *v.* Prieto," 16 "Common Bench Reports," N.S., 578); and then there was the later case already cited, "Leman *v.* Houseley," to the same effect. There were two earlier cases, indeed, in the Irish Courts, apparently to the contrary effect, but these were overruled by the later cases, and to these later cases he adhered. The medical man whose representative sued had not rendered the services sued for, and he could not recover, and therefore the nonsuit was right.

Mr. Justice Denman concurred, observing that the medical man here did not show that he had rendered the services sued for, and so he could not recover. The services sued for were rendered by another person, who was unqualified, without any consultation with him. It was urged that this person acted as his servant; but a qualified practitioner could not thus authorize an unqualified person to act for him in medical attendance. It would be a mockery to apply the doctrine of master and servant to such a case, and it would entirely defeat the intention and object of the Act.

Appeal accordingly dismissed.—*Times.*

Reviews.

A Text-Book of Organic Materia Medica. By Robert Bentley, M.R.C.S. Eng., F.L.S.*

A good, reliable authoritative work on materia medica, apart from therapeutics, has now for some years been a desideratum. Statements are so often copied from one work into another, without being in every case verified, that a feeling of distrust is engendered thereby. The publication of 'Pharmacographia' marked a distinct era in the history of works of materia medica, since all the statements made in it were verified wherever possible; but in spite of its trustworthiness, that work has the drawback of not treating of all the ordinary drugs kept by chemists and druggists, while describing several not in use in this country. Pereira's 'Materia Medica,' even in its last edition, formed rather too bulky a book for constant use as a text-book, and the arrangement adopted in it was unsatisfactory. The size of the work now under notice is much more convenient, and it was with the hope that the desideratum had at last been obtained that its pages were eagerly scanned. A careful inspection, showed, however, that it is very elementary in character, and that although the author intends it for "the use of students during their apprenticeship, and as a text-book for them while attending a course of lectures, and as a preparation for their examination," it must be regarded only as giving a general outline of the subject, leaving many details to be subsequently filled in from a course of lectures on materia medica, as well as from those on botany and chemistry. This mode of treatment is perhaps the best for the student, as the long experience of the author has doubtless proved to him, and is probably necessary in order to condense the vast amount of available material into a convenient compass.

But the apparent disadvantage of the elementary character of the book is counterbalanced by the fact that references are constantly made to more extensive works on the subject, or to original papers in the *Pharmaceutical Journal* or elsewhere. Thus, under aconite, the reader is referred to Bentley and Trimen's 'Medicinal Plants,' vol. i., pl. 6., for a botanical description of the official species, and for the adulterations of the root to papers in the *Pharmaceutical Journal.*

The references to the most recent and important papers on the chemistry of the different articles of materia medica are, however, not so frequent or so numerous as could be wished. Thus a better idea of the chemistry of aconite, of rhubarb, of podophyllum rhizome and of Indian hemp would be obtainable by a reference to the papers which have been published on these subjects since the appearance of 'Pharmacographia.' The student will also find it necessary to supplement the work under notice by consulting the 'Extra Pharmacopœia,' or he may be misled by such statements as the one that "picrotoxin is not used internally."

The advantages which the pharmaceutical as well as the medical student will find in the 'Organic Materia Medica' are: a useful table of contents, so arranged as to show at a glance the drugs belonging to each of the natural orders, the part used, and the botanical classification adopted both in this work and in the author's 'Manual of Botany;' freedom from too great a mass of detail, so that the memory is not too much taxed at first and a clear idea of the general outlines of the subject can be got by a single perusal; an account of the animal materia medica, and of many non-official drugs that are sometimes omitted from works on materia medica, and a number of accurate woodcuts, which will be found very useful by the student.

The text is written in a very readable style, and is remarkably free from printers' errors, the only one that was noticed being that of Kabar*b*ine for Kabar*d*ine musk. Regarded as an elementary work it may be recommended as giving an excellent bird's-eye view of materia medica, and as serving as a good introduction to more exhaustive treatises on the subject. The student must, however, not forget that no work on materia medica can be absolutely complete or up to date, and that the study of the most advanced work on the subject should always be supplemented by a reference to the most recent papers in the various medical and pharmaceutical journals.

* London: Longmans, Green and Co. 1887. Small 8vo. Pp. i.-xxviii., 1-416. 7*s.* 6*d.*

A Manual of Botany. By Robert Bentley, F.L.S., M.R.C.S. Eng. Fifth Edition.*

Bentley's 'Manual of Botany' is now so well known and extensively used, both as a manual for students and as a work of reference on economic botany, and has in successive editions been so carefully revised, that only the alterations and improvements which have been made in the present edition require notice here.

Since the first edition was issued attention has been increasingly paid by teachers of botany to the microscopical details of plant structure, and to the study of vegetable physiology, while systematic botany has been comparatively neglected. This appears to have been in great measure due to the importance to medical students of a comparison between the processes of life and of diseased growth in plants and animals. In order to bring the work up to date concerning the researches that have been made of late years in this direction, Professor Bentley has availed himself of the assistance of Mr. J. W. Groves, Demonstrator of Practical Biology in King's College, in revising the portion relating to physiology. This forms an admirably condensed epitome of the immense mass of published material in which the varied and often contrary opinions of different botanists are clearly set before the student.

But, however useful this portion of the work may be to *medical* students or to students of organic chemistry, it is the structural, systematic and economic portions of the work that will prove of most value to the student of pharmacy. In the structural portion the student will be thankful for the clear and simple manner in which the modern terms such as thallome, caulome, meristem and many others are introduced and explained. Although the beginner may do well to master a primer on the subject before reading this portion of the work, the more advanced student will find it most valuable for reference. The economic sections have been brought well up to date, the additions to the new British Pharmacopœia being included, as well as a large amount of new matter taken from various journals.

In the systematic portion the author has wisely followed the 'Genera Plantarum' of Bentham and Hooker, except in the *Monochlamydeæ* and *Monocotyledones*, in which a modification of Le Maout and Decaisne's classification is introduced by the separation of the monocotyledons into *Petaloideæ* and *Glumaceæ*. The classification adopted by Professor Bentley in this respect undoubtedly is easier for students to remember, and is more in accordance with that of the other sub-classes in the 'Genera Plantarum.' It has, however, the disadvantage that it cannot serve as a preparation for the use of that important

* London: J. and A. Churchill. 1887. Crown 8vo. Pp. i.-xxxii., 1-902. 15*s.*

work, and that the series adopted by Professor Bentley run one into the other. Among the cryptogams the lichens are retained as a natural order, although the widely accepted theory of their consisting of fungi parasitic on algæ is carefully stated. In the present condition of our knowledge, this plan is by far the most convenient, since in systematic works on lichens the Schwendenerian theory is almost without exception ignored, and none of the leading lichenologists adopt it.

Covering, as the manual does, a more extended field than many other botanical text books, it is likely to continue, for many years, to be one of the most useful works of reference for botanical students of all classes. We trust that the author may find that the labour and time expended in bringing it to its present state of completeness and compactness, may be rewarded by the increasing sale that the work unquestionably deserves.

What to do in Cases of Poisoning. By William Murrell, M.D., F.R.C.P., etc. Fifth Edition.*

This little book having now reached its fifth edition, the author can well afford to feel independent of critics and take the jubilant tone affected in the Preface. He says that the attainment to a fifth edition is not his fault, and he disclaims responsibility for it. We can only say that the success has been well deserved, for the book is a model of compactness and, what is more important, it presents in a clear form just the information required in an emergency where the effects of poison have to be promptly combated. If we were to make one suggestion it would be in favour of an index, though this is perhaps hardly required. Although the author provides this little prompt-book, he evidently considers the medical man should be independent of it. He says to his reader: "It is possible that you may experience a difficulty in remembering the antidotes to the various poisons. If so, rest assured that your knowledge of pharmacology is defective. All rational treatment of cases of poisoning is founded on a correct appreciation of the physiological action of drugs." It may be added, that in anticipation of the occurrence of cases of poisoning from overdoses of "patent medicines," Dr. Murrell gives a list of the "supposed active ingredients" of some of the more popular preparations.

Obituary.

Notice has been received of the death of the following:—

On the 7th of June, Mr. Francis Edmund Bromley, Chemist and Druggist, Northumberland Place, Bath. Aged 72 years.

BOOKS RECEIVED.

Year-Book of Treatment for 1886. A Critical Review for Practitioners of Medicine and Surgery. London: Cassell and Co., Lim. 1887. From the Publishers.

Botany Notes. By Alexander Johnstone, F.G.S., Part I. Histology and Physiology. Part II. Systematic Morphology. Edinburgh: E. and S. Livingstone. 1887. From the Publishers.

Atlas Manuel de l'Histologie des Drogues Simples. By J. Godfrin and C. Noël. Paris: F. Savy. 1887. From the Authors.

The Commonhealth: A Series of Essays on Health and Felicity for Every-Day Readers. By Benjamin Ward Richardson, M.D., F.R.S. London: Longmans, Green and Co. 1887. From the Publishers.

The Mineral Water Maker's Manual for 1887. London: J. G. Smith. From the Publisher.

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* London: H. K. Lewis. 1887. 32mo. Pp. 1–220.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Chloral Hydrate and Fehling's Solution.

Sir,—With respect to the reduction of Fehling's solution by chloral hydrate, I beg to say that I have reason to believe the explanation of Mr. J. E. Saul (page 1028) to be perfectly correct, namely, that it is the chloroform resulting from the decomposition of the chloral hydrate by the alkali that really causes the reduction, and not the formate simultaneously produced, as assumed by Mr. J. J. Thomas.

In connection with the point in question, I may perhaps be permitted to quote the following passage from my 'Commercial Organic Analysis,' vol. i., page 177:—"The reduction of Fehling's alkaline copper solution is also a good and delicate test for chloroform, with which it reacts thus:—

$$CHCl_3 + 5\,KHO + 2\,CuO = Cu_2O + K_2CO_3 + 3\,KCl + 3\,H_2O.$$

When the solution is heated, the formation of the yellow-red cuprous oxide occurs very promptly. The reaction might probably be used for the determination of chloroform in the absence of other reducing agents, especially if the test were applied to a liquid obtained by distillation. Chlor-ethylidene and alcohol do not interfere with the test." On page 173 of the same work the following passage occurs:—"Solutions of chloral reduce Fehling's solution on testing. The reaction may be employed to detect traces of chloral if other reducing substances be absent, and might probably be made quantitative."

The statements made of the qualitative reaction of chloral and chloroform with Fehling's solution are the results of my own experiments, but whether the equation representing the chloroform reaction was quoted from some other observer, or was simply my own expression of the probable decomposition I am unable to recollect.

Sheffield. Alfred H. Allen.

"Drumine."

Sir,—The announcement in the *British Medical Journal* for March 26 of the isolation from *Euphorbia Drummondii* of an alkaloid possessing anæsthetic properties likely to rival those of cocaine, without the disadvantages which this latter alkaloid is known to possess, naturally soon attracted the notice of some leading members of the medical profession, and recently a sample of the substance was placed in my hands for examination, with the view of determining a convenient mode of exhibiting it for therapeutic trial. It presented the appearance of an almost white, dry, odourless and tasteless powder, which under the microscope was seen to consist of octahedral crystals; it produced no reaction when applied to moistened litmus paper; treated with various solvents it was found to be insoluble in water, dilute acetic acid, alcohol, ether and chloroform, but soluble in dilute hydrochloric acid, from which it was reprecipitated on the addition of ammonia in excess.

The hydrochloric solution gave no precipitate with the usual alkaloidal reagents, potassio-mercuric iodide, phosphomolybdic acid, etc.; gently ignited on platinum foil, but little charring took place, and a considerable greyish residue soluble with effervescence in HCl, and answering in characters and tests to calcium carbonate, was obtained. It afforded no indication of the presence of nitrogen. On drying at 100° C. it lost 4·9 per cent.

0·397 gram of the dry substance carefully ignited in a platinum crucible gave a greyish residue weighing 0·232

gram =60 per cent. Sufficient evidence has, I think, been given that the substance in question consisted almost entirely of calcium oxalate. It is only fair to state, in this connection, that the accredited agents in this country of Dr. Reid's new alkaloid (?), having found it "unsatisfactory," have declined any further supply of the article at present.

Westminster Hospital, S.W. A. E. TANNER.

UNFAIR COMPETITION.

Sir,—Under the above heading Mr. Humphrey assumes that the certificates possessed by the average chemist, given by the Pharmaceutical Society as evidence of his having successfully passed the requisite examinations, and that he is well qualified to carry on the responsible business of a chemist, is not a sufficient guarantee for the public to have. He further remarks that the certificates are obtained more or less by luck, leaving one to infer that at times the examiners are more strict than at others, and that the certificates are not impartially, deliberately, and soberly awarded. Now this is a grave accusation against the examiners. Mr. Humphrey also speaks of a scrambling apprenticeship. I should like to know what the gentleman exactly means by the term "scrambling." Are the youths supposed to be scrambling for pharmaceutical facts during the time of their pupilage? If so it denotes a great desire to know on their part.

Mr. Humphrey also gives it as his opinion that competition is rather beneficial than otherwise, and I am inclined to agree with him, if the competitors compete on equal terms, but can it be said that chemists and grocers compete on equal terms?

The grocer is allowed to sell every drug in creation except the scheduled poisons without passing any examination at all, and when compiling his price list he has not to note money and time spent in acquiring a knowledge of the drugs he offers for sale.

Chemists do not want to whine and do not whine for favours; they only ask for, and should demand, justice.

My contention is, that if it is expedient for the safety of the public that chemists should be examined before they are allowed to exercise their calling as retailers of drugs, etc., grocers also ought to be examined before they are allowed to retail drugs.

If the Pharmacy Act were extended to all dealers in drugs, grocers would soon cease to be opponents of chemists.

157, *High Street, Borough.* FRANK J. EBBUTT.

Sir,—Referring to Mr. Humphrey's letter published in your issue of June 11, I think most of us will in the main agree, but the charge he makes that the certificates of our Society are "obtained more or less by mere luck" is contrary to my experience. Many a good man, well up in his subjects, gets plucked—possibly from excessive nervousness, impeded speech, or other cause (and therefore I think the proposed partly written examination will be an advantage to the candidate)— but I think a man ill prepared seldom, if ever, passes. I have confirmation for this statement in the fact that four candidates to my knowledge presented themselves for examination at the last meeting of the Board; three of these were what I call crammed (six months' study), the fourth had made his studies part of his daily work for a period of five years; the first three failed, but the fourth received his certificate.

I think the fault is this: a candidate having passed the necessary qualifying examination considers his education finished, and instead of making his knowledge the basis of further culture, permits his knowledge to gradually lapse, and ultimately forgets the greater portion of it. It is not my province to dictate to my confrères, but I certainly think it would be to our mutual advantage to make a kind of hobby of some especial branch, say of natural history, biology, zoology, etc.

I think all will agree with me that to place a book before a man who cannot read it would appear to that man as a senseless mass of black marks, and so it is with nature, the further a student advances the more interesting it becomes. Finally, I think, Sir, if we are to gain the confidence of the public and the elevated position to which we are entitled, the external world must be shown we are worthy of that position, and that the chemist of to-day—thanks to the Pharmaceutical Society—is not the chemist of fifty years ago, but a man of education, culture, and refinement. The only way to demonstrate this fact to the public is by showing them we are well informed upon subjects outside our business—the things of every-day life—because of the substance of our business they are incompetent to judge. FREDERICK DAVIS.

A PLEA FOR APPRENTICESHIP.

Sir,—May I offer a few scanty remarks concerning the letter which appears in a recent issue under the title of "A Plea for Apprenticeship?" I have not the opportunity of knowing whether your correspondent, Mr. Humphrey, is established in business, and is an employer of both apprentices and assistants, but I must say if he acts toward them as he very ably dictates to others it does him much credit.

Regarding the "curriculum" which has so prominently occupied your columns of late, I think from many standpoints it would be received with joy by those who are perhaps standing between two points, as to whether they shall enter on the career of a chemist or not, when I narrate my own case. I was apprenticed to a chemist within seven miles of London, and to a man who figured very prominently about the year 1870 in the annals of Bloomsbury Square and to whom was paid a heavy premium, which of course I expected, taking into consideration his very exceptional qualifications; but little did I expect that I was chaining my start in life to one who would blight my efforts to success.

During my whole apprenticeship I seldom if ever made a plaster, and I scarcely saw a prescription; my general routine from morning till night being to weigh and wrap up packets, etc. As for general treatment it was simply unbearable, and shop-cleaning, sweeping, beating mats, cleaning windows, running household errands, and distributing bills from door to door, was about the only instruction towards the "exams" at Bloomsbury Square that I received. Having no father to defend my cause I have no doubt advantage was taken on that score, but I may tell my fellow students, that notwithstanding all, I have still managed to stick to my colours, and my only hope now is that I may at a future date reap some benefit, although the "silver lining" has not yet shown itself to me at the "Square." I agree with your correspondent that "some" do act towards their apprentices "as they would be done by."

On the other hand I must say that the fault lies often on the apprentice's as well as the master's side; but still for all that, if the apprentice will not learn when he has the opportunity, why does the master keep him?

I am afraid "Money" is the key to this.

I will now conclude by saying, How much better if I had paid my money to a college for proper instruction instead of repenting the waste of a perhaps golden opportunity. TOWCESTER.

G. W. W.—(1) *Plantago major.* (2) *Brassica Napus.* (3 and 4). Send specimens in flower.

P. H. Marsden.—(1) *Ornithogalum umbellatum.* (2) *Cerastium glomeratum.* (3) *Plantago lanceolata.* (4) *Vaccinium Myrtillus.* The B.P., 1885, has already been reprinted.

G. A. Grierson.—Andromeda rolifolia.

Nemo.—Chertier's copper is a compound used in pyrotechny, and is made by mixing equal parts of finely powdered sulphate of copper and chlorate of potash into a paste with strong solution of ammonia and drying at a moderate temperature.

R. H. R.—(1) See Roberts on the Pancreatic Digestion of Milk (*Pharm. Journ.*, June 12, 1880, p. 999). (2) Try a cochineal colouring.

W. F. Quick.—(1) *Veronica Chamædrys.* (2) *Stellaria Holostea.* (3) *Geranium Robertianum.* (4) *Nepeta Glechoma.* (5) *Cardamine pratensis.* (6) *Vinca minor.*

Assistant.—The chloroform ordered is about four times as much as the water is capable of dissolving, though the solution might be more or less affected by the tincture. The undissolved portion might be diffused by means of mucilage, or if this is not allowable use a "shake the bottle" label.

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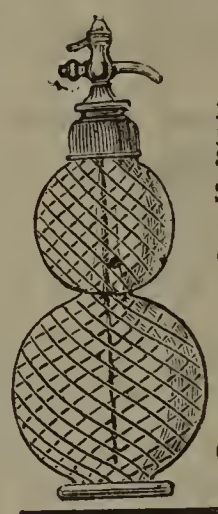

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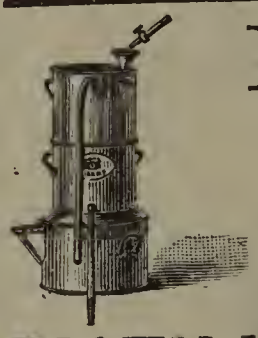

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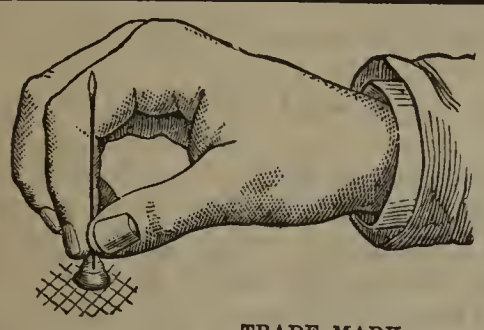

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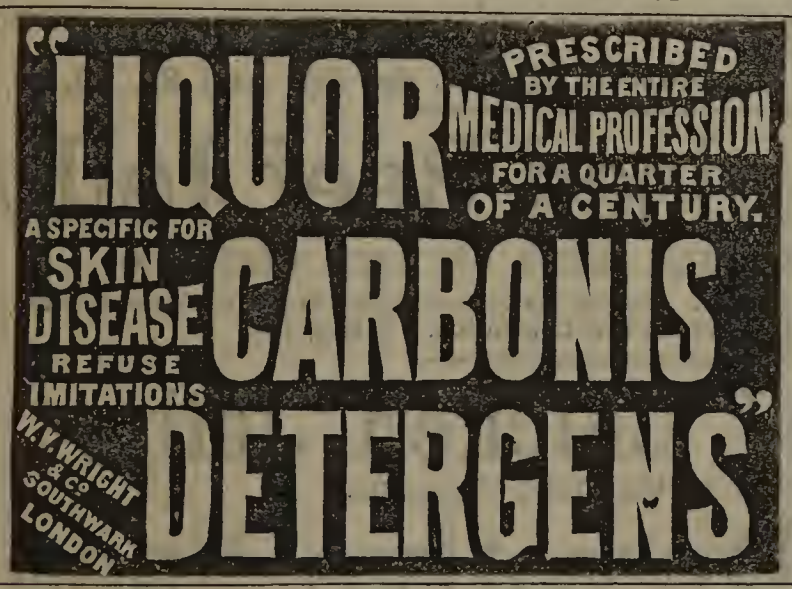

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The Pharmaceutical Journal AND Transactions.

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Pharmaceutical Society of Great Britain,

17, BLOOMSBURY SQUARE, LONDON.

RICHARD BREMRIDGE, Secretary and Registrar.

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This Examination will be held throughout Great Britain, at 11 a.m., on the **second Tuesday** in January, April, July, and October. Candidates must give notice to the Registrar in London on a printed form of application, to be obtained from him, and pay the Fee, not less than *fourteen* days prior to that on which the examination is to be held.

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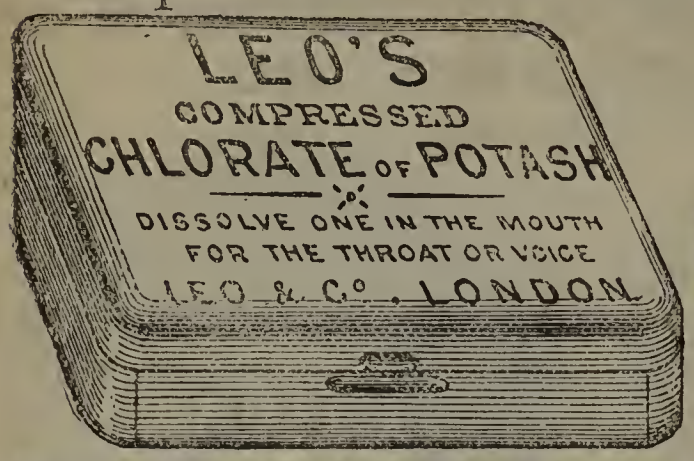

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"BLOOD MIXTURE."

Reply to Circular of Mr. CLARKE'S Solicitors, dated 13th June, 1887.

Mr. Clarke's Solicitors omit to state the fact, that our clients, Messrs. JOHN BEEDZLER & CO., of "THE GOLDEN KEYE," 18, Norton Folgate, London, E.C., are taking proceedings to have the words "Blood Mixture" removed from the Register of Trade Marks. The case is complete and is in the list waiting its turn to be heard.

Clarke's circular does not draw attention to the fact that in the cases quoted the Defendants *consented* to the injunctions which were obtained by arrangement and were not granted after argument in open Court.

Neither does the circular state the fact, that in December last Clarke applied for an injunction against Mr. Geddes, a Chemist at Oldham, and that an arrangement was come to by which Mr. Geddes *consented* to an injunction, *but only on condition that Clarke paid Geddes' costs of the action.* At Clarke's instance this was afterwards advertised as a victory.

Can Clarke quote a single contested case in which after argument in open Court he has obtained an injunction for infringement of the words "Blood Mixture," unless there has been colorable imitation or other fraud?

Messrs. Beedzler, who deprecate anything in the nature of a fraudulent imitation, contend that the words "Blood Mixture" are not a good trade mark, that they are not fanciful, but are entirely and wholly descriptive of the article to which they are applied, and that there is no name which would more appropriately describe a medicine for the purification of the Blood.

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Professor Redwood.	Professor Attfield.
Joseph Ince, Esq.	Messrs. Dinneford & Co.
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Messrs. Blake, Sandford & Blake.	Messrs. Twinberrow & Son.

And by upwards of 130 other leading Chemists in London alone, all of whom are of opinion that the words "Blood Mixture" are words in common use, and purely descriptive of a preparation intended to act upon and purify the blood of a person taking it, and are certainly not fanciful words.

We may add that, for upwards of 80 years past, our clients and their predecessors in business have sold medicine under a descriptive title, of which the words "Blood Mixture" form part.

PLUNKETT & LEADER,
60, St. Paul's Churchyard, London, E.C.
Solicitors for Messrs. JOHN BEEDZLER & CO.

June, 1887.

"THE MONTH."

Amorphous Cocaine.

In the present number of the Journal will be found a letter from Dr. Stockman, in which he takes objection to the remarks made last week in reference to his opinion as to the nature of the substance known as "amorphous cocaine." He there states very fully his reasons for doing so, but he still fails to furnish any information that would suffice to establish the existence of "hygrine," and until that is done it is impossible to accept the solubility of cocaine in hygrine as being a *vera causa* that accounts for the difference between cocaine and the amorphous basic substance that is too frequently associated with it. The accounts given by Wöhler and Lossen of the substance to which they applied the name of "hygrine" are so vague and meagre that at most it only ranks among the apocrypha of chemistry, and chemists who have since endeavoured to obtain a substance answering to their description have failed to do so. Dr. Stockman has not given any description of "hygrine," and the experimental data he gave in his paper, though they may be in themselves correct, do not in any degree serve as evidence of its existence. The question as to the nature of amorphous cocaine must therefore still be regarded as an open one. As a matter of fact that substance differs from true cocaine in not being crystallizable, and the fact of its yielding benzoic acid on decomposition does not prove it to be cocaine. Even if it be a compound of true cocaine with "hygrine" or some other base it is not the less distinct from cocaine. In addition to this evidence of difference of a physical and chemical nature there is the physiological evidence furnished by Dr. Stockman himself that amorphous cocaine causes considerable irritation when applied to the eye. This fact is after all the most conclusive as regards the practical use of cocaine preparations containing this amorphous substance, and so far as that point is concerned the tendency of Dr. Stockman's paper appears to be in perfect accord with all that has been said on this subject in this Journal.

Cacao Husks.

The husks or shells of cacao seed are sometimes utilized for making a cheap beverage, and are also said to be employed in adulterating ground spices. Mr. P. S. Clarkson reports (*Amer. Journ. Pharm.*, June, p. 277) that he has found them to yield 9·07 per cent. of ash, which, besides the usual constituents, contained aluminium, also found by Wanklyn in the ash of cacao. In addition there were obtained 0·9 per cent. of an alkaloid that gave the usual reactions for theobromine; 5·32 per cent. of a fat corresponding with cacao butter; 0·93 per cent. of an odorous resin soluble in ether and alcohol, as well as albuminoids and colouring matter.

Duboisine.

About seven years ago, Professor Ladenburg, during his investigation of the mydriatic alkaloids, arrived at the conclusion that duboisine, the base obtained from the Australian *Duboisia myoporoides*, was identical with hyoscyamine (*Pharm. Journ.*, [3], xi., 351), though as generally met with probably contaminated with some impurity. This opinion was subsequently challenged by Herr Harnack, who affirmed that duboisine exercised a much stronger physiological action than hyoscyamine. Professor Ladenburg has therefore been induced to re-investigate the subject, working upon a sample of duboisine supplied by Herr Merck. The base as received was a yellow-brown syrupy mass, which was dissolved in hydrochloric acid and precipitated with gold chloride. The gold salt had at first a resinous appearance, but after four recrystallizations it became homogeneous, melting constantly at 197°–198°, and showing all the properties and having the same elementary composition as the gold salt of hyoscine. Neither hyoscyamine nor any other alkaloid could be detected in the first mother-liquor from the gold salt. Professor Ladenburg is of opinion that the explanation of this different result probably lies in some variation in the method of preparing the duboisine, but he confesses he cannot say in what respect. It will be remembered that the name "hyoscine" was appropriated for a base found in the mother-liquor after the removal of hyoscyamine in preparing that alkaloid from henbane; it is isomeric with atropine and hyoscyamine, but is split up by alkalies into tropic acid and pseudotropine.

Emetine.

Although emetine was one of the first of the vegetable bases discovered, having been separated by Pelletier and Magendie in 1817, its chemical history has for seventy years remained very incomplete, and several contradictory statements have been made as to its composition. This has been no doubt partly due to the failure to obtain the alkaloid in the crystalline condition. A careful investigation by Herr Kunz of what he believes to have been the pure alkaloid has led him to the conclusion that emetine is a biacid base, and a tertiary diamine like quinine (*Archiv*, June 15, p. 461). He considers that its elementary composition is represented by the formula $C_{30}H_{40}N_2O_5$, which differs by C_2 from that attributed to the alkaloid by Lefort and Wurtz. The introduction of a methyl group yielded a new base which was obtained as a hydrate,—"methylemetonium hydrate,"—to which the formula $C_{30}H_{40}(CH_3)N_2O_5$ is attributed. This compound was amorphous and very hygroscopic, and the sulphate was the only crystalline salt prepared from it. "Methylemetonium" differs sharply from emetine in its physiological action, in which it resembles curare, 0·0037 gram injected subcutaneously into a frog producing total paralysis of the motor system in two minutes. It is thought very probable that emetine, like quinine, is a chinoline derivative. Besides emetine, ipecacuanha root contains choline.

Choline in Indian Hemp.

The presence of a basic constituent in Indian hemp has been reported by several chemists, who have, however, shown considerable diversity of opinion as to its nature. At first it was stated to be identical with nicotine, but this was disproved by Siebold and Bradbury (*Pharm. Journ.*, [3], xii., 326), who, however, found a volatile base that they named provisionally "canabinine." Afterwards, Dr. Hay expressed an opinion (*Ph. Journ.*, [3], xiii., 998) that the drug contained several alkaloids, and reported that he had obtained one in crystals, which, on account of its tetanizing property, he called "tetano-cannabine." Messrs. Warden and Waddell, however, working upon a large quantity of Indian hemp failed to isolate Dr. Hay's compound (*Ph. Journ.*, [3], xv., 574). Herr Jahns now reports (*Archiv*, July 15, p. 479) that he has separated from Indian hemp a base which he has identified as choline, and points out that this result corresponds

fairly well with the statements of previous workers, except in respect to the crystallizability of Dr. Hay's alkaloid and its solubility in ether. The quantity of choline obtained by Herr Jahns from different samples of Indian hemp varied considerably, but amounted at the most to one-tenth per cent.; it was also found to be present to a less extent in commercial "cannabinum tannicum."

Aniline Camphorate.

Referring to the fact that the recent discovery of antipyretic properties in acetanilid ("antifebrin") has opened up a possible future in therapeutics for another group of compounds, aniline derivatives and salts, Herr Vulpius points out that a compound of aniline and camphoric acid had previously been credited by Tomaselli with antispasmodic properties (*Pharm. Centralh*, June 9, p. 283). This salt does not usually figure in trade lists, but Hager, in his *Handbuch der pharmaceutischen Praxis* (vol. i., p. 364), states that it can be prepared by dissolving 50 parts of camphoric acid ($C_{10}H_{16}O_4$) in 150 parts of absolute alcohol, and adding to the solution 56 parts of aniline, or sufficient to produce a neutral liquid, which is then left to evaporate spontaneously in a dark place. The product so obtained is described as occurring in small white or reddish odourless prisms, having a pungent acrid taste and easily soluble in water, alcohol and ether. This formula is objected to by Herr Vulpius on the ground that excess of aniline is ordered, and that it is difficult to ascertain the exact point of neutralization with the ordinary indicators, paper stained with the violet colouring matter of dahlia petals, which is coloured green by aniline, being the most convenient. Moreover, he considers the use of alcohol as unnecessary, and liable to lead to discoloration during the evaporation, even in the dark. He prefers to heat together in a closed vessel, at the temperature of a boiling water-bath, 100 parts of finely-powdered camphoric acid and 93 parts of aniline. The crystallization of the aniline camphorate is said to commence in a few minutes, but to take some time to complete, though its progress is accelerated by contact with a wide surface of the containing vessel. Aniline camphorate—$(C_6H_7N)_2.C_{10}H_{16}O_4$—thus prepared, is said to dissolve in alcohol and ether, but not freely in water, of which it requires about 30 parts, and in its solubilities generally it approximates to aniline rather than to camphoric acid. Chloroform and carbon bisulphide appear to break up the compound, taking up the aniline and leaving a residue of camphoric acid; heated fat oils and oil of turpentine behave more or less similarly. Apart from the alcoholic and ethereal solutions, which are not adapted for hypodermic use, the best solvent for aniline camphorate is glycerine, which takes up one-tenth of its weight, and can then be diluted with an equal weight of water. The maximum single dose of aniline camphorate given by Tomaselli as an antispasmodic was 0·2 gram, and the maximum quantity administered in one day 0·8 gram, which was usually given dissolved in four volumes of ether or ether-alcohol, and enclosed in a gelatine capsule.

Convolvulin from a New Source.

In a communication from the pharmaceutical laboratory of the University of Erlangen Dr. Schutze describes some interesting results obtained in an examination of the fruit of *Pharbitis triloba*, Meiq., a convolvulaceous plant indigenous to Japan, and used medicinally in that country (*Pharm. Centralh.*, June 2, p. 270). A preliminary treatment of the finely divided fruit with ether removed a quantity of greenish-brown extract consisting principally of fixed oil. The residue was then exhausted with alcohol, and from the alcoholic extract were obtained, by suitable treatment, a tannin giving a green precipitate with salts of iron, a crystalline acid, and a brown resin. This resin, after purification by precipitation from alcohol and treatment with animal charcoal, was obtained as a yellowish-white amorphous mass, yielding on trituration an almost odourless whitish powder that had acid properties, irritated the mucous membrane and provoked sneezing. The resin had a melting point about 140° C., but first became transparent at 148° to 150° C., and decomposed at a higher temperature. It was freely soluble in alcohol and acetic acid and almost insoluble in water, but in hot water it became softened without notable solution. It was dissolved by alkalies and with heat by alkaline carbonates, separating upon the addition of acids as a white precipitate. Further it was insoluble in ether, chloroform, light petroleum spirit, benzol and carbon bisulphide. The resin did not reduce Fehling's solution, but exhibited glucosidal properties upon boiling it with dilute hydrochloric acid; it was reddened by concentrated sulphuric acid and when treated with nitric acid it yielded sebacic acid as a decomposition product. In these and other characters, as well as in elementary composition, it corresponded with convolvulin from jalap root, with which body Dr. Schutze considers it to be identical. It may be added that a similar conclusion was arrived at by the authors of 'Pharmacographia' respecting the resin derived from "kaladana seeds" from the closely allied *Ipomœa Nil*, Roth. (*Pharbitis Nil*, Choisy).

Constituents of Red Sanders Wood.

Red sanders wood or red sandal wood (*Pterocarpus santalinus*) is a substance that has hitherto been only partially investigated as to its constituents. Pelletier and others separated from it a crystallizable colouring matter, that has been named "santalin" or "santalic acid," and Weidel isolated a crystalline body isomeric with piperonal ($C_8H_6O_3$), which he named "santal." In addition Cazeneuve obtained a magnificent crystalline substance, which he only partially studied, and named "pterocarpin." In again taking up the study, M. Cazeneuve has separated, with pterocarpin, a body that appears to be homologous to it, and which he has therefore called "homopterocarpin" (*Comptes Rend.*, civ., 1725). The compounds were obtained by digesting powdered sanders wood with milk of lime, drying, exhausting the cake with ether, distilling the yellow ethereal liquor to dryness, and treating the residue with boiling alcohol, which deposited on cooling a crystalline mixture of pterocarpin and homopterocarpin, separable by treatment with bisulphide of carbon, in which the latter is soluble and the former is not. Pterocarpin melts at 152° C., and has a composition agreeing with the formula $C_{10}H_8O_3$. Homopterocarpin melts at 82° C. and is represented by the formula $C_{12}H_{12}O_3$. Both compounds, when fused with potash, give off an odour resembling that of coumarin and probably belong to that group.

Parkia Biglobosa.

Messrs. Heckel and Schlagdenhauffen have published in the *Journal de Pharmacie et de Chimie* (p. 601) an analysis of the fruit of *Parkia biglobosa* (*Leguminosæ*), which they state is known, in common with cola

nuts, under the name of "café du Soudan." By the natives of different parts of Equatorial Africa, the tree passes under the names of "houlle," "néré," "nérétou," "doroa" and "rounuo." The pods appear to contain a large quantity of sugar, yielding to boiling alcohol as much as 59·6 of soluble matter, of which 39·25 is glucose, and 15·65 inverted sugar. Illustrations of the pod and of the microscopical structure of the seeds are given.

Betol.

Betol is the name that has been given to a recently introduced compound of β-naphthol with salicylic acid—the β-naphthol ether of salicylic acid—analogous to that to which the name "salol" has been applied (*Pharm. Centralh.*, June 2, p. 280). The preparation, which is the subject of a patent, is described as melting at 95° C.

Antifungin.

A white sweet-tasting powder, said to consist of a soluble borate of magnesia, prepared by a special process, has been introduced under the name of "antifungin," as possessing extraordinarily powerful disinfecting properties, and as being a specific against diphtheritis (*Pharm. Centralh.*, June 2, p. 281). It is said to be soluble in four parts of boiling water, and it is used as a 15 per cent. solution. From 5 to 20 drops, according to age, are administered every one or two hours, and about a teaspoonful is sprayed hourly in the sick-chamber. Further, the diphtheritic growth is painted with the solution every one or two hours until it disappears.

Photoxylin.

"Photoxylin," a substance used in Russia by photographers, has been recommended by Professor Wahl, of St. Petersburg, as a substitute for collodion in surgical practice (*Lancet*, June 18, p. 1253). He states that a 5 per cent. solution of photoxylin in equal parts of alcohol and ether, when applied to the skin, forms an impervious dressing that adheres firmly and is not easily rubbed off in washing. In small operations he has found that the application of this solution makes it possible to dispense entirely with more bulky antiseptic dressings.

Strophanthus as a Hypnotic and Antipyretic.

Dr. Boyd reports (*Brit. Med. Journ.*, June 18, p. 1373) that in a case where there was acute heart failure, consequent upon suppuration and exhaustion, the administration of tincture of strophanthus not only improved the cardiac action, but also produced marked hypnotic and antipyretic effects. The antipyretic action of the drug had been previously mentioned, though incidentally, by Professor Fraser.

Carduus Marianus.

Mr. George Foy (*Med. Press*, p. 492) calls attention to the properties of *Carduus marianus*. He states that this plant is now being received with professional favour in France, where the tincture and alcoholic extract are both being prescribed. He remarks that the extract is a useful adjunct to aloes, since it possesses cholagogue properties.

Remijia ferruginea.

The physiological action of *Remijia ferruginea* has recently been investigated by Messrs. Pinet and Duprat. In a note on the subject communicated to the Biological Society they state that the drug acts chiefly on the medulla oblongata, and that it causes a considerable increase of respiratory movements and of cardiac pulsation. The preparations used were a watery and a spirituous extract of the root, the aqueous being the most active. Both extracts were acid to litmus paper. (*Brit. Med. Journ.*, June 4, p. 1236).

Fluorides of Ammonium and Iron.

The fluorides of ammonium and iron are recommended in the *Practitioner* (p. 413) by Dr. G. Lucas for the treatment of hypertrophy of the spleen. The former salt is prepared by saturating a solution of hydrofluoric acid with ammonia, and allowing the mixture to evaporate over quicklime. The fluoride crystallizes in hexagonal prisms, which dissolve readily in water, forming a colourless solution. The strength of the solution used by Dr. Lucas is 4 grains to the ounce, of which the dose is 5 minims, cautiously increased to 10 or even 20. The doses must be taken after a meal, otherwise the remedy is liable to cause nausea and diarrhœa. Dr. Lucas keeps the solution in a bottle coated inside with wax.

Tinctura Ferri Muriata.

In the *British Medical Journal* (June 4, p. 1206) Dr. C. Bell, of Edinburgh, points out that the tincture of muriate of iron is of much more therapeutic value in the treatment of erysipelas, etc., than the tinct. ferri perchloridi, B.P. It should therefore be remembered by dispensers that "tinct. ferri mur." cannot be regarded as identical with "tinct. ferri perchloridi." Prescribers, on the other hand, who intend the old preparation, containing basic chloride, of the P.E., 1841, and of the P.L., 1851, to be dispensed, should indicate as much on the prescription, since the B.P. gives tinctura ferri sesquichloridi as a synonym of tinct. ferri perchloridi, and if they order tincture of muriate of iron, should in like manner append the letters P.E., 1841, or P.E. 1813, according to the preparation intended, the first named, "*Ferri muriatis tinctura*," being a preparation of the red oxide, and that of the latter, "*Tinctura muriatis ferri*," of the black oxide of iron. The dispenser is bound to be guided by the present Pharmacopœia unless the physician indicates otherwise.

Tertiary Alcohols.

As the result of a number of observations Dr. Shapiroff states that tertiary alcohols differ in their physiological action from primary alcohols in exercising a depressant instead of a stimulant influence. Dimethylethylcarbinol was found to diminish the blood pressure, paralysing the vasomotor centres, but without exerting any direct action on the heart (*Lancet*, June 18, p. 1256). The action of trimethylcarbinol was found to be similar, but less marked and slower. According to another Russian observer, Dr. Simanovski, the latter compound is capable of being used advantageously as a soporific, the dose for an adult being from ten to twenty drops. Trimethylcarbinol was first prepared by Butleroff by the action of zinc methyl on oxychloride of carbon, and also by its action on chloride of acetyl.

Muscale Buttons.

A rather risky personal experience as to the physiological effects of "muscale buttons," a "fruit" chewed by Mexicans and Indians for purposes of intoxication, has been put on record by Dr. Briggs, of Dallas, Texas (*Med. Bull.*, May, p. 144). The "buttons" are described as being about two inches in diameter, half an inch thick, and covered with minute prickles, and as being probably derived from a species of cactus. They are said to be eaten by the Indians six to ten at a time for the sake of the beautiful visions and oblivion from trouble they produce, the eater be-

coming unconscious after a short time, and remaining so for two or three days, during which time he is believed to have intercourse with the spirit world. Dr. Briggs ate only one-third of a "button," but in fifteen minutes arterial tension was manifest, and in forty-five minutes his pulse had increased to 120 and his respirations to 30 per minute. Immediately afterwards the pulse went up to 160, it seemed difficult to breathe sufficient air to maintain life, and further observations were prevented by unconsciousness. Upon partial recovery he sought help from a medical colleague, who treated him with aromatic spirit of ammonia and whiskey in large doses, every few minutes, the first dose being administered about one hour after eating the "button." In about half an hour relief was experienced, and after six or eight hours, with the exception of malaise and depression, he had recovered his normal condition. Dr. Briggs considers the "fruit" should be further investigated, but betrays a disposition to leave to some one else a continuation of the personal experiment.

Large Dose of Morphia.

In the *Boston Medical Journal* (May 12, p. 443), Dr. Lemen reports a case in which a powerful man, aged thirty-eight years, attempted to commit suicide by taking a large dose of morphine sulphate. The salt was poured from a bottle on to the palm of his hand, and then "eaten down," the quantity swallowed being estimated at thirty-six grains. Fifteen minutes afterwards the man drank a fluid drachm of spirit of chloroform. About two hours and a half seem to have elapsed before medical aid was brought in, when the respirations were six per minute, pulse sixty-eight, the pupils "pin-hole," and the patient cyanotic. Attempts to administer tartar emetic having failed, as the reflex act of swallowing could not be excited, three successive twenty-minim doses of fluid extract of belladonna were administered hypodermically, after which the current from eighteen cells of a Macintosh battery were applied. Next apomorphia was injected in three doses of one-sixth of a grain at half-hour intervals, but as this did not provoke emesis an attempt was made to wash out the stomach. Subsequent treatment consisted in continuation of the current, general stimulation, and the administration of large doses of citrate of caffeine. Seventeen hours after ingestion of the poison the patient vomited, and could be aroused sufficiently to be made to walk with assistance, from which time he gradually recovered. Dr. Lemen states that there can be no doubt that the entire quantity of thirty-six grains of morphine sulphate remained in the man's stomach at least five hours before any of it could possibly have been eliminated.

Poisoning by Nutmeg.

A case of poisoning by nutmeg is recorded in the *British Medical Journal* (p. 1085), in which one nutmeg had been eaten by a patient as a cure for diarrhœa. It caused him to become giddy, stupid and very drowsy all next day. The narcotic properties of these seeds, and of others of the same natural order, do not appear to be generally known, and seem worthy of investigation.

Ferment of Protoplasm.

The curious observation has been made by M. Fokker (*Comptes Rend.*, civ., 1730) that if a portion of tissue be taken from any part of the body of a recently killed healthy animal, and introduced with precautions necessary to prevent its contamination by microbes into a sterilized liquid, it is capable of converting sugar into acid and starch into glucose. This he attributes to the action of the protoplasm, since the fermentation goes on when the most minute microscopic scrutiny fails to reveal the presence of microbes. When the production of acid has reached a certain stage the fermentation stops, but upon neutralizing the liquid it recommences. The only difference detected between the fermentative action of protoplasm and that of microbes was quantitative, that of microbes being greater, it is suggested, in consequence of their power of multiplication.

Cork.

The *American Druggist* for this month contains an interesting article on the uses of cork, taken from *La Nature*. It is generally known that the coarse powder of cork is used, glued on paper, for protecting fragile objects, but it may not be so widely known that the finer powder constitutes what in France is called "liégerie," or "subérine," used as baby-powder instead of lycopodium, and that an insecticidal preparation known as "zifa" is made of cork powder impregnated with phenol. Spanish black, which is said to be one of the finest and most indelible blacks known to painters, is likewise stated to be made from carbonized cork.

Liquefaction of Ozone and Ethylene.

Herr Olszewsky reports that at the temperature of oxygen boiling under atmospheric pressure (−181·5° C.) he has succeeded in liquefying ozone (*Monatshefte*, viii., 69), it having been left as a dark blue liquid upon allowing the oxygen from ozonized oxygen to pass from the liquid to the gaseous state. In determining the boiling point of pure ozone, which was found to be −106° C., liquefied ethylene was used, which, in contact with ozone, exploded violently. The solidification of ozone has not yet been effected. In the same apparatus, using liquefied oxygen as a refrigerating agent, ethylene was solidified at a temperature of −169° C.

Sulphurous Acid in Snow.

The results of the examination of snow taken from different places in Munich and its neighbourhood, by Herr Sendtner (*Chem. Rep.*, June 12, p. 137), would seem to indicate not only that snow has a considerable faculty for absorbing sulphurous acid from the atmosphere, but that the absorption goes on continuously for some time. Snow taken and examined on one and the same day from a spot south of the old churchyard gave per kilogram 25 mg. SO_3=20 mg. SO_2; from a courtyard near the chimney of the Hygienic Institute, 32 mg. SO_3=25·6 mg. SO_2; and from the yard of the gasworks, 60 mg. SO_3=48 mg. SO_2. These figures show the influence of neighbourhood to fires. It was ascertained that on the day snow fell sulphurous and sulphuric acids were present in it in fairly equal proportions, but on the second day almost all the sulphurous acid had been oxidized to sulphuric acid. As to the accumulation, it was found that snow taken from different parts of the city on the day it fell contained—expressed as SO_3—7 to 8 mg. per kilogram; on the fourth day 32·8 mg.; on the sixth day, 40·6 mg.; on the eighth day, 48·4 mg.; on the tenth day, 62·2 mg.; and on the fourteenth day as much as 91·5 mg. Snow taken from a district free from factories only showed 7·8 mg. of SO_3 after fourteen days. This great absorptive power towards sulphurous and sulphuric acids is considered of great practical interest as explaining the destructive influence of snow upon marble statuary.

Falcaria Rivini.

A cornfield weed new to Britain has recently been detected in Kent, in the neighbourhood of Westgate-on-Sea. It is *Falcaria Rivini*, Host., an umbelliferous plant which is well known on the continent as a cornfield weed (*Journ. Bot.*, p. 182). The plant bears a general resemblance to *Cicuta virosa*, and, indeed, belongs to the same section of the Umbelliferæ. The generic distinctive features are the less marked calyx teeth, the dilated disk with an undulated margin and small central stylopodium, and the leaves with elongate lobes which are cartilagineo-serrulate. The fruit is oblong, with nearly pentagonal carpels, and the bracts both of the involucres and involucels are numerous, and the flowers polygamous.

Digitalis Monstrosities.

During the last few years digitalis appears to have been more subject to the formation of monstrous flowers than formerly. This week two specimens have been forwarded in which the terminal flower of each raceme presented almost the appearance of that of *Lilium auratum*, being open, funnel-shaped and three and a quarter inches in diameter. In one, judging from the number of anther-bearing stamens and of stamens turned to petals, the terminal flower must have been formed by the abnormal development of six ordinary flowers in one. The calyx lobes formed a kind of involucre below the flower. The ovary was furnished with an opening in the centre of the stigmas, and on slitting the side of it open was observed to contain a tuft of tiny leaves occupying the centre. The apparent pericarp consisted of the flattened and united carpels, in which some seeds were developed. The most remarkable feature in the monstrosity is the fact that whereas the usual inflorescence is centripetal, the abnormal flower, although forming the terminal bud, opened first, and was fully expanded whilst the remainder of the flower-buds were pursuing their ordinary mode of development, the largest being below, and those immediately beneath the abnormal flower being small and unopened. The specimen above described, which was sent by Mr. J. P. Balkwill, is stated by him to be only one of five, the others being developed similarly at the apex of distinct racemes, all five being borne on one individual, other plants in the neighbourhood not being similarly affected. In some of the five the ovary appeared to consist of fewer carpels and to present nearly the usual appearance. Mr. T. Padwick, of Red Hill, also sends specimens developed in the same abnormal way, a large open flower being developed at the apex of each raceme. The determinate inflorescence and the appearance of the large terminal bud at an early period are facts that are the less easily explained because the leaves are not opposite in digitalis, and it cannot be compared with the curious interrupted blossoming of the flower-heads of *Dipsacus* in which the capitulum is practically a condensed cyme. Possibly a microscopical examination of the structure of the stem and flower might throw light on the anomaly.

Leefe Herbarium.

English botanists will be glad to learn (*Nature*, p. 159) that the valuable botanical collections of the Rev. J. E. Leefe, hitherto one of the principal authorities on British willows, have been presented to Kew Herbarium, so that his fine collection of salices will now be available for purposes of reference.

NOTE ON THE ACTION OF ZINC CHLORIDE ON CASTOR OIL.*

BY C. R. ALDER WRIGHT, D.SC., F.R.S.

Castor oil has, as is well known, a somewhat peculiar constitution as compared with other oils and fats. Whilst, like these, it is a threefold ether of ordinary glycerol, the acid radical present is of a character different from that of palmitic, stearic, oleic, linoleic acids, etc., in that it contains more oxygen; so that the various acids of oils and fats may be distinguished as belonging to the several families—

$C_nH_{2n}O_2$ —*e.g.* Stearic acid $C_{18}H_{36}O_2$: Palmitic acid $C_{16}H_{32}O_2$.
$C_nH_{2n-2}O_2$ „ Oleic acid $C_{18}H_{34}O_2$.
$C_nH_{2n-4}O_2$ „ Linoleic acid $C_{18}H_{32}O_2$ (according to earlier experiments, $C_{16}H_{28}O_2$).
$C_nH_{2n-2}O_3$ „ Ricinoleic acid $C_{18}H_{34}O_3$.

Accordingly, the glyceride of ricinoleic acid (the main constituent of castor oil) differs in numerous physical and chemical characters from the glycerides of the other commonly-occurring fatty oils and acids, more particularly in its specific gravity and solubility in alcohol and other menstrua. Inasmuch, however, as ricinoleic acid belongs (like oleic and linoleic acids) to the series of non-saturated substances, therein differing from stearic acid and its homologues, it possesses, in common with the former, the property of becoming polymerized by contact with certain agents—of which nitrous acid or materials generating it is one of the best known—and thereby altered in physical condition to an extent depending somewhat on the nature of the polymerizing agent, and the extent and duration of its action, etc.

Whilst experimenting in conjunction with Dr. Alexander Muirhead upon actions of this class, it was observed that zinc chloride in concentrated solution, or as fused hydrated crystallized salt, possesses a most marked thickening and solidifying action upon certain oils, and more especially upon castor oil, so that under suitable conditions this latter is converted into a horny or gristly indurated mass, which, when freed from zinc chloride by thorough washing with water, is capable of various useful applications, more especially as an ingredient in mixtures intended as covering and insulating materials for electric leads, etc. According to the proportion of zinc chloride used and its concentration and the temperature employed, the degree of solidification and induration effected can be controlled at will, the consistency of the product varying from a somewhat thicker and more viscid or semi-solid oil up to a tough, leathery, cartilaginous mass, resembling rasped horn. The most effective treatment consists in evaporating down zinc chloride solution until the boiling point rises to near 175° C., at which temperature the degree of hydration is not far from that corresponding with the formula $ZnCl_2,H_2O$. This concentrated fluid is then cooled to about 125°, and well intermixed by agitation with one-third its weight of castor oil at about the same temperature. The oil rapidly becomes converted into a thick clot, which separates from the fluid zinc chloride in lumps resembling bullocks' liver in appearance, but becoming a mass of nearly white cartilaginous shreds when digested with water and vigorously agitated therewith. The zinc chloride used is practically all recovered, the majority in the form of hot fluid separating spontaneously from the clot and ready for immediate use over again, and the remainder in the form of aqueous solution washed out from the clot and simply requiring evaporation down to the proper strength.

The cartilaginous shreds thus obtained differ much in their general physical character from the original uncon-

* Read before the Society of Chemical Industry. From the Journal.

verted castor oil, being practically insoluble in the various menstrua in which the latter dissolves. The glyceridic character, however, is not wholly destroyed; thus notable quantities of impure glycerol can be obtained by long-continued boiling with alcoholic potash of the shreds, previously completely freed from all traces of unconverted oil by repeated digestion with carbon disulphide.

AMYL ACETATE.*

BY HENRY TRIMBLE.

This compound ether has recently come into use for manufacturing purposes without attracting any scientific attention. Its value depends on the excellent solvent power for pyroxylin which it possesses. Good soluble gun cotton will dissolve in it until a jelly is formed and the vessel may be inverted. On this account it has become valuable to the manufacturer of celluloid, and to the manufacturer of certain kinds of lacquer for coating brass and copper. These two industries are consuming enormous quantities of this solvent, and the probabilities are that the use of it has not fairly commenced.

The employment of acetate of amyl, or pear oil, in the manufacture of artificial fruit essences has long been known, and for this purpose it has commanded a high price, so high indeed as to exclude the possibility of its general use as a solvent; but for the above mentioned industries it can be made commercially pure to answer the purpose as well as the highly purified and more agreeably smelling compound. Two patents have been taken out in England during the past three years bearing on this subject. One on account of its property of dissolving gun cotton, the other on a method of manufacture. In the former the inventors claimed the solution to be valuable for the making of varnishes, and that "when 200 parts nitro-cellulose are mixed with 600 parts acetate of amyl a mass of doughy consistency is obtained, which can be used for any purpose for which celluloid is used. With the addition of castor oil, china clay, and a small proportion of certain essential oils, a compound suitable for the production of artificial leather may be produced."

Several methods of manufacture have been prepared, but the one most common in the United States consists in heating in a lead or glass retort a mixture of acetate of sodium or calcium, sulphuric acid and fusel oil.

The ether distils at 137° C., has a specific gravity at 15° of ·876 and is almost absolutely insoluble in water. Its solvent action is not confined to gun cotton, for it readily dissolves tannin, fixed and volatile oils, resins and camphors, and may become a valuable solvent in pharmacy in addition to the several uses it already possesses.

* From the *American Journal of Pharmacy*, June.

THE LANCET ON ADULTERATION.

In an editorial article dealing with the subject of proposed legislation affecting adulteration the *Lancet* for Saturday last has the following passages:—

"Of much greater importance is the question of drugs. The patient is practically at the mercy of the dispenser, and the dispenser depends on the merchant, who may or may not be the manufacturer. The manufacturer commands the situation, for the dispenser cannot analyse every drug which he receives. So it happens that, although most manufacturers and dispensers are honest and careful, any individual patient runs the risk of losing all the benefit of medical treatment through the imperfection of the drugs administered to him. The only standard that can be set up is evidently that of the British Pharmacopœia, and even this must be used with discretion, for some drugs are so unstable that it is impossible to keep them for any time without deterioration. It would be for the public benefit that all important drugs should be frequently analysed by some impartial chemist, but in many cases a warning instead of an immediate prosecution would satisfy justice. The adulteration of quinine is one thing, the defective strength of hydrocyanic acid quite another.

"The real remedy for the present uncertainties and irregularities of the law can only be found in a new and efficient Food and Drugs Act, framed on the basis of the present. We are prevented by limits of space from stating in sufficient detail our ideas of the Act as it should be. But a few of the salient points may be sketched. The Act should be not less wide than it is now, and ought to include in its purview all adulterations of food or drugs, whether noxious or merely fraudulent. The powers of the central authority should be considerably strengthened, and it should be able to compel the enforcement of the law. A large number of local authorities do their duty thoroughly, and it would be unwise to interfere with them; but others do nothing, or next to nothing. In many places no analyst is appointed, and in others no work is found for him to do. Such authorities must be coerced if the public is to be protected. Opinions will differ as to the best way of securing the administration of the law, but one way is obviously possible. Having compelled the appointment of efficient public analysts in every district, the Local Government Board might have power to insist that a sufficient number of properly selected samples should be sent for analysis. If this duty were systematically neglected, the board should be able to appoint their own inspector, and to charge the offending district with the expense. The regulations for the collection of samples require thorough revision. We quite agree with Dr. Bell, of Somerset House, that the inspector should have the power to enter premises and select his own samples, dividing them into portions, and paying for them as at present. Sometimes, as in the case of beer, large samples are required, and there is in all cases a risk that the vendor, knowing the inspector or his envoy, or guessing at the object of the purchase, may substitute a pure for an adulterated article. All articles of food and medicine should be included under the Act, whether subject to excise duty or not. There need be no conflict between the public analysts and the excise chemists. The main duty of the latter is the protection of the revenue; but an analytical department is necessary for this purpose, and we see no reason why the Government chemists should not continue to act as they do now as referees in disputed cases. Their powers should be more accurately defined, and some arrangement should be made with regard to perishable articles, such as milk, the analysis of which can never be quite satisfactory unless made upon a fresh sample. Finally, the new Act should contain a carefully drawn schedule in which the principal articles of food and drugs were defined, and limits of purity assigned, With regard to drugs this can easily be done by referring to the British Pharmacopœia as a standard. Food will occasion more difficulty, but none that need be insuperable after the experience that has been gained in the last few years. Milk, butter, and beer are the articles which have given rise to most controversy. In this and our last week's article, we have considered the last two, and we have often stated our views in regard to milk. To the public analyst is at present assigned the impossible task of ascertaining how much water has been added to or how much cream removed from the milk, and as milk is sometimes naturally very poor, he is compelled to take a low standard of purity. The Act might properly provide that milk should be held to be adulterated if it did not contain as much as 3 per cent. of fat and 9 per cent. of solids not fat, or if it contained any substance foreign to milk. The offences of watering and skimming could then be detected with certainty, and the public would be secure of getting good if not very rich milk. At present the limits used by most public analysts are $2\frac{1}{2}$ per cent. of fat, and $8\frac{1}{2}$ per cent. of solids not fat, which represent a very poor milk.'

The Pharmaceutical Journal.

SATURDAY, JUNE 25, 1887.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

ADULTERATION.

THE subject of adulteration is one that must always have an especial interest for pharmacists, not only because of the vast importance of ensuring the purity and good quality of the articles they have to deal with in the ordinary course of their business, but also because the practical familiarity with chemical manipulations which they are expected to possess may often be brought to bear with advantage in the detection and exposure of the fraudulent practices which are so frequently had recourse to for the sake of meeting competition in various branches of trade. In regard to ordinary articles of food and of domestic use, some form of sophistication has become so general, and the fact is so little heeded by the great mass of the public, that the existence of a Food and Drugs Act and the appointment of public analysts are inadequate for its prevention. In many cases it may indeed be undesirable to interfere with practices that have for their object the provision of low priced commodities, for with certain limitations as to such practices being free from objection on the ground of prejudice to health they find their justification in the demand for low priced articles which is an almost universal characteristic of the present time. The production of substitutes for various articles of daily consumption has in fact become a branch of industry of no mean importance, and there is much reason for believing that the result has been in the main advantageous to a large class of the community. But while giving full weight to considerations of this kind as furnishing a justification for the supply of oleomargarine as a substitute for butter, and for the admixture of chicory with coffee, it cannot be admitted that there is a shadow of excuse for the sale of these or similar articles under the names of the genuine articles for which they are substituted by the dealer. It is to this aspect of the matter that attention requires to be directed, and there are now before Parliament several bills, the object of which is to prevent the systematic deception that is practised in regard to several articles of food. We have eminent testimony to the fact that ordinary beef fat, or even kitchen grease, can be prepared in such a manner as to constitute a useful and wholesome article of food of such a character that it can be used as butter, and very often cannot be distinguished from butter except by experts. In like manner the admixture of chicory with coffee furnishes a material that can be sold at a low price, which satisfies the demand of a large class of consumers, and is, at the same time, free from any injurious qualities. To the sale of these and similar articles, no kind of objection can be raised; but it is a scandalous fact that they should be sold as butter and coffee. The frequent prosecutions that take place under the provisions of the Food and Drugs Act, however, prove that this is being done in many instances, and there is good reason for believing it to be done very much more generally than is suspected. The action that is taken under the Food and Drugs Act in prosecuting for such offences may indeed be regarded as altogether disproportionate to their extent. In the case of coffee, moreover, there is the further evil to be borne in mind, that the toleration of the sale of a mixture of coffee and chicory when declared to be such, opens the door to a form of sophistication that may be as prejudicial to the purchaser as total substitution. So long as a mixture may be sold without specification of the proportions, it may as well be nine-tenths chicory as nine-tenths coffee, without infringing the letter of the law, and it has actually been found that such "mixtures" vary in their proportions to an enormous extent, and without any relation to the prices at which they are sold.

But admitting the desirability of putting a stop to the sale of mixtures and substitutes under names they have no claim to,—and we cannot conceive that to admit of being disputed, either from the point of view of the consumer or of the tradesman who desires to supply his customers with what they ask for,—there is still the very difficult question as to the mode in which any legislative provisions for that purpose are to be enforced. In looking through the successive returns of the public analysts throughout the country, the failure of the present Act is plainly apparent from the almost absurd paucity of cases inquired into. The fact is, that while local authorities are indisposed to put the law in force with vigour, individuals rarely take advantage of the opportunity it affords them for having commodities analysed for their own satisfaction. We have no sympathy with the motives which now and then lead to spasmodic raids at the instigation of a public analyst desirous of occupation or notoriety. Such proceedings are quite abnormal and inconsistent with the spirit of the Act, but very much of the work that has been done under it has been of this character, and it yet remains to devise a mode of procedure by which the services of efficient public analysts may be rendered continuously available to protect the interests of the public and really repress adulteration. In the last two numbers of the *Lancet* attention has been directed to this subject, and while taking credit for

having been the means of suppressing to some extent the more noxious form of adulteration which was rife prior to 1851, it is admitted that the administration of the existing Acts is so irregular as to leave much to be desired. As an amendment of the law it is suggested that the powers of the central authority should be considerably strengthened, and it should be empowered to compel the enforcement of the law. We are very much disposed to agree with this idea as representing the only likely mode of making any Adulteration Act useful. But then there is a further serious difficulty as to the standards of purity to be adopted. In many cases this appears almost insuperable, for while there are natural objections to the setting up of arbitrary standards, the adoption of natural standards would often involve the necessity of taking such a wide range that practically the result would be to legalize the lowest quality of some articles. For instance, milk is notably a case in point, and there can be no question that milk of unquestionable purity is sometimes below the standards that have been adopted for deciding whether water has been added or not.

In regard to the subject of drugs, while agreeing in the main with the views expressed by the *Lancet* as to its importance, we cannot acquiesce in the suggestion that the dispenser who has entrusted to him the welfare of patients would be justified in depending upon the merchants or manufacturers from whom he obtains his drugs, or even preparations, for their purity or good quality. His duty is rather to be faithful to the patients, who, as the *Lancet* says, are practically at his mercy, and that involves the capability of being in a position to vouch for the character of every article he dispenses. The plea that he cannot analyse every drug that he receives is inconsistent with the responsibility appertaining to his work. It is, we conceive, the business of the dispenser to do so, and as much for the sake of his own reputation as anything else. Pharmacists should, we think, be especially tenacious on this point, for upon it hinges entirely their claim to a rate of remuneration different from that which would be suitable in the case of a vendor of ordinary commodities.

The resolution adopted at the recent meeting to carry the Chemists and Druggists' Trade Association on for twelve months can scarcely be regarded in any other light than the expression of a belief that there is a need of such an organization on the part of the small number of persons present, and as regards the conditions essential for its maintenance the resolution appears somewhat inconsistent with the inexorable logic of fact. To our apprehension the most essential condition of being a representative body has still to be supplied by an extension of the number of members far beyond the 1400 who have expressed themselves willing to support the Association. The suggestion that in future greater reliance should be placed upon voluntary work manifested but a poor appreciation of the services that have been rendered in the past by the members of the Executive Committee. All the work that has been done has been upon the voluntary system, for it surely cannot have been intended that the payment of travelling expenses is to be regarded as remuneration for the time and labour bestowed upon the conduct of the business. But perhaps the most ominous indication is to be found in the fact that out of a body of some 14,000 registered chemists only 1400 appear to think that they have any interests worth the contribution of 10*s.* 6*d.* a year for the maintenance of an association intended for their benefit.

* * *

Mr. James Hargreave, the well-known chemical manufacturer, has for several years past been engaged upon the construction of a hot-air engine in which the energy of the fuel consumed shall be much more completely converted into motive power than is the case in the steam engine. It is now announced that his efforts have been so far crowned with success that he is able to produce 30 indicated horse-power from a consumption of two gallons of common coal tar per hour, or at a cost, at present prices, of about three-halfpence per hour. This, it is claimed, "is the highest efficiency ever obtained by actual practice in any form of thermodynamic engine, and also the least costly." The fuel, however, is not necessarily coal tar, but may be petroleum, or other liquid hydrocarbon, or coal. The combustion, which is too complete to allow of the emission of smoke, is described as being carried on in a small but intensely heated chamber, the fuel being forced in under pressure.

* * *

Among the eminently select group of persons who have been recipients of Jubilee honours we notice that a knighthood has been conferred upon Dr. A. B. Garrod, who has been for many years an honorary member of the Pharmaceutical Society.

* * *

The death is announced of Dr. Karl Damian Ritter von Schroff, Emeritus-Professor of Pharmacognosy and Pharmacology in the University of Vienna. Dr. v. Schroff was born in 1802 at Kratzau, near Reichenberg, in Bohemia. In 1830 he became Professor of Theoretical Medicine in Olmütz University, but five years afterwards removed to Vienna, where he established a considerable reputation through his investigations in materia medica. He retired in 1870.

* * *

We regret to notice in the *Australasian Journal of Pharmacy* the report of the death of Mr. William Johnson, who for the last twenty years has held the appointment of Analytical Chemist to the Victorian Government. Mr. Johnson was a pupil in the School of Pharmacy, Bloomsbury Square, during the session of 1845, when he gained certificates in Organic Chemistry and Practical Pharmacy. He was for some time in business in Liverpool, and after his emigration to Australia he took an active part in founding the Pharmaceutical Society of Victoria, and he was one of the original members of the Pharmacy Board of that colony.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

June 15, 16 and 17, 1887.

Present on the 15th and 16th.—Mr. Carteighe, President; Mr. Gostling, Vice-President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner, Taylor and Thresh.

Present on the 17th.—Mr. Carteighe, President; Messrs. Barnes, Blunt, Bowen, Corder, Fletcher, Gale, Gerrard, Greenish, Linford, Ransom, Symons, Tanner, Taylor and Thresh.

Dr. Greenhow was present on the 15th and 16th on behalf of the Privy Council.

MAJOR EXAMINATION.

15*th.*—*Four* candidates were examined. *One* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists :—

Gibbs, Sydney .....Eastbourne.
Sansom, Frederick James .....Barrow-in-Furness.
Webber, James Wilkey .....Taunton.

16*th.*—*Five* candidates were examined. *Two* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists :—

Andrews, Edward Arthur .....London.
Clubb, William Herbert .....Liverpool.
Lang, John West.....Southport.

MINOR EXAMINATION.

15*th.*—*Twenty* candidates were examined. *Eleven* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists :—

Bishop, George Henry.....Southampton.
Cole, Vincent Theobald .....London.
Cross, Arthur Richard.....Shrewsbury.
Driffield, Robert .....Spilsby.
Escritt, Harold Teal .....Driffield.
Foot, William R. Whiteway ...Totnes.
Gardner, Frederick William ..Newark.
Gould, William Emanuel .....Twickenham.
Thomas, John Evan.....St. Clears.

16*th.*—*Twenty* candidates were examined. *Ten* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists :—

Gray, William Edwin .....Pickering.
Griffith, Martin Luther .....Weston-super-Mare.
Hanslow, Charles Edward .....Woodford.
Harry, Joseph .....Swansea.
Hart, Jane .....London.
Hobbs, Harry .....London.
Hucklebridge, Wilfred.....London.
Langford, Frederick Charles ...London.
Loveluck, Griffith David.....Taibach.
Marsh, William Henry .....Old Catton.

17*th.*—*Twenty-four* candidates were examined. *Nine* failed. The undermentioned *fifteen* passed, and were declared qualified to be registered as Chemists and Druggists :—

Mitchell, John Albert.....Bradford.
Nicholls, Charles .....Wellington, Som.
Payne, William .....Wendover.
Rideal, Frank ....Hyde.
Southam, Stanley.....Manchester.
Tharp, Arthur .....Croydon.
Thomas, Lewis.....Bristol.
Tothill, Mortimer A. Legett ...London.
Vause, John Edward .....Swansea.
Walder, Frank.....Arundel.
Walklett, George James.....Oxford.
Westmoreland, William Hy. ...Salisbury.
White, Thomas Henry .....Whitby.
Woodward, Moses Mellor .....Nottingham.
Young, Edward Francis.....Portishead.

PRELIMINARY EXAMINATION.

17*th.*—Certificates by approved examining boards were received from the undermentioned in lieu of the Society's examination :—

Babst, Robert Vaughan .....Middlesborough.
Butler, William Barber .....Cromer.
Coulson, Thomas .....Leicester.
Felce, Howard .....Kettering.
Gaziello, Marius .....London.
Greaves, William Abraham ...Ironville.
Polley, Thomas E. ....London.
Roberts, Thomas Livingstone...Haverfordwest.
Rogers, Ernest Henry.. ... .Liverpool.
Saltmer, George .....Darlington.
Strawson, Vincent Valentine Latham, Liverpool.
Taylor, Alfred .....Morriston.

Chemists and Druggists' Trade Association of Great Britain.

A Special General Meeting of the members of this Association was held on Friday, June 17, at the Inns of Court Hotel, Lincoln's Inn Fields, Mr. Cross (of Shrewsbury) in the chair.

The SECRETARY read the notice convening the meeting, and also a list of gentlemen who had sent letters of apology for not being able to be present.

The CHAIRMAN said, as President of the Association, he could not help feeling a certain amount of regret at having to preside at a meeting called to consider such a resolution as was about to be proposed. That such an Association, representing not only a select few, but chemists and druggists throughout Great Britain, should, after a comparatively few years, have to consider at a special meeting whether it was expedient to wind it up or not was a great misfortune to the trade throughout the country. He well remembered before the Association was formed how the Pharmaceutical Society was considered by some to be the Society of only a few, and people excused themselves from joining it because they said the doors were not wide enough. Thereupon it occurred to a few chemists and druggists that an Association should be formed on a completely democratic basis, which might include the whole of the chemists in the country. At one time it appeared that their expectation would be realized, for a very large measure of success had attended the Association during its existence. It might be that it still had years of prosperity to go through, but he must say when he had put into his hand an intimation that a resolution would be moved by two past-Presidents, such as would presently be brought forward, he felt that those who had most experience in the matter had formed an opposite conclusion. They were all agreed, he believed, that the need for such an Association was as great now as ever, and it seemed to be a piece of folly that it should be allowed to slip out of existence; but it had much better do so unless it were really representative of those it professed to serve, and unless sufficient funds could be provided to carry it on in a proper manner. They did not want to have to do as they did in the past, and as he had been sometimes ashamed to do, to make special appeals for funds on every occasion. They wanted to go forward with real power and weight or else not at all: they had only weakened the cause of those they professed to serve if they could not act as well as speak. Unless they could continue the Association as a representative, solvent and powerful Association it had better be dropped. He hoped there would be a full and free discussion, the benefits of which would not be confined to those present, but would be appreciated

by the trade throughout the whole country, and he, as Chairman, should endeavour to be quite impartial in the matter.

Mr. THOMAS BARCLAY (Birmingham) said this meeting was the result of what had taken place at the meetings of the Executive of the Association and of the Urgency Committee. At these meetings it was found impossible to carry on the work of the Association vigorously unless they had an income of at least £1000 a year. The Executive had felt for some time past that cases might arise which would require a large amount of money, and they would be obliged to allow such cases to go by default, because they had not funds at disposal to carry them forward vigorously, and so the interests of the whole trade would be damaged. They had been living for some time past from hand to mouth. A clear note had been sounded to the trade, that they must have £1000 a year as a minimum if they were to do the work expected of them. An appeal had been made and 1400 gentlemen offered to subscribe to the Association as the result. At the last Executive meeting he opposed a resolution for winding up the Association, because he felt that 1400 was not such a bad number after all. At an earlier stage of their history only about 1200 had responded to an appeal for a 5*s.* subscription, and he thought that 1400 offering to subscribe 10*s.* showed some advance, but he was outvoted by a majority of the Executive, though only a narrow majority, the numbers being seven to six. He then wanted a further appeal to be made, but his friends around him felt that they had appealed and appealed until they had humiliated themselves, and that they had no right to place themselves in that position. He still hoped against hope, and they had spent some money in advertising; three notices had appeared in the various trade journals stating that this meeting would be called to wind up the affairs of the Association, and he had hoped that during the interval the number of subscribers would come forward, but he was sorry to say that during the interval the number responding was only something like fifty.

The SECRETARY said it was only twenty-six.

Mr. BARCLAY said it appeared therefore that through the indifference of the trade, not from hostility to the Association, there was not the desire for a trade organization which there ought to be to enable it to work successfully. He was glad to see so many around him who had supported the Association from the first. There were about eight gentlemen present who were members of the Executive in 1876, and they had pinned their faith to it, had given their work to it, and were present to-day to give an account of their stewardship, and he felt that they had a record of which they need not be ashamed. Mr. Radley, who was one of the founders, had kept by the Association all the way through. He moved the original resolution, that it was desirable for the protection of the trade that an Association should be formed, and on those lines they had acted steadily during all these years. On more than one occasion they had been able to protect the trade in emergencies, and had done a deal of good work. They had not been long in existence before they had to defend some of their members from prosecutions under the Adulteration Act, and the trade might be proud to look back to that time when scientific witnesses, such as had never been seen before in any trade prosecution, presented themselves in court and helped them to win that case after an appeal. The young Association won its first laurels on that occasion. Then came a fight with a much larger adversary, the Apothecaries' Society, in which also they were ultimately victorious, and won for the trade vested rights which would certainly have been lost had the Association not been in existence. In that very hotel he remembered seeing the venerable witnesses who were brought up to give evidence in the Court of Queen's Bench, and it was a thing to be proud of that the trade had sufficient energy to be able thus to successfully defend itself. The Association had also been very successful with the Government Departments. When it was thought necessary to stamp apothecaries' weights and measures there was a great deal of difficulty, and the Association, by going to the Board of Trade Department, was the means of getting a document sent out by the then President, Mr. Chamberlain, instructing the Inspectors of Weights and Measures that where the local authorities determined to put the Act in operation due notice should be given of their intention, and that this should be done before the Inspectors were authorized to visit the shops in the district. That was in June, 1880, and it saved chemists from being very much harassed. Again, with regard to the Inland Revenue Department and the question of the Patent Medicine Stamp, a meeting was held in London and a deputation sent to Somerset House, who saw the Commissioners. After a long interview it resulted in a memorandum being drawn up by the Association which had been at the service of all the members, and which gave clear instructions how every chemist could keep within the four corners of the Act, a most difficult Act to understand; and a further concession was obtained, the Commissioners agreeing that any chemist who felt in doubt whether his preparations required a stamp or not, should receive information if he sent up to the office. Again, the Medical Acts Amendment Bill was introduced into the House of Commons by Lord George Hamilton, and it contained provisions intended to put down counter prescribing. If that Act had passed no chemist would have been able to prescribe without being liable to a prosecution, but the Association had an interview with Lord George Hamilton, and after petitioning and interviewing members the result was the Bill was withdrawn. Again with regard to the Dental Act introduced by Sir John Lubbock, the Association was able to get the interests of chemists protected, and those who were practising dentistry were exempted from the operations of the Bill. Again, with regard to the Trade Marks Act, many marks had been removed from the register which would have operated seriously against the trade, such as "menthol," "extract of malt," "Persian sherbet," and a host of others. But unfortunately funds were again lacking, and although the Executive placed their services unreservedly at the command of the Association, they had not the funds to carry out the work, and it had to be dropped. No doubt the trade would have benefited very materially by this time if this work had been continued. All this work had been done on a 5*s.* subscription. They had spent £3000 in law, and he did not think that any one could say that a penny of it had been wasted, looking at the record of prosecutions and defences. But they felt that they could not go on in this way; they were crippled for want of funds and it was better that the trade should understand that there was no Association at all, rather than that it should be leaning upon a crutch which would give way in the first emergency. It was better for everyone to rely upon himself than to be looking to an Association which could not really do the work. The Pharmaceutical Society had been in existence for forty-five years and had only some 3500 members. The Pharmaceutical Conference, during its first few years, only obtained 258 members, and therefore seeing that they had promises from 1400 he felt that there was still life in the Association, that a great many people wished it to live, and he thought it a great pity that these 1400 who were anxious to organize themselves and carry on the work and act as a nucleus if any emergency should arise were not able to do so. He well remembered a statement of Mr. Richard Reynolds, in his address as chairman of the first meeting held in Birmingham. He then said concerning the Association that if defence, and not defiance, were to be a leading principle, there would be a considerable irregularity in the work to be done in different years. That he believed to be

the real state of the case. The trade just now was in a very bad condition; all kinds of voluntary associations were suffering, and people declined to give money to everything they possibly could. As had been said by the editor of the *Chemist and Druggist* no one could brand this Association as a failure, and perhaps the very completeness of its success had ruined it. The Editor of the *Pharmaceutical Journal* also said, when an appeal was made that the Pharmaceutical Society should have a trade protection department, that apart from the great difference between the work of the Society and that properly appertaining to such a body as the Trade Association, the experience of the latter body had not been so favourable as to excite any keen desire to assume its functions. That no doubt would militate against any further efforts in the same direction. As to the necessity for such an Association, he would only say that chemists and druggists were subject to penalties under the Poisons Act, under the Adulteration Act, under Lord Campbell's Act, and under the Apothecaries Act, and every man had now to contend with the opposition of the stores, which was a question which ought now to be faced. All the members of the Executive had felt that if their hands had not been tied they ought long ago to have taken up that question. The thing was now working in such an outrageous manner that he thought public opinion would come to the rescue of the chemists. As an illustration of the hardships they had to suffer he might say that he knew one case in which a store had been started, and a man who was only fit to put up shutters, and who had been employed for such work by a neighbouring chemist, a man who got drunk continually, was supposed, because his name was on the Register, to give responsibility and position to other persons so that they might carry on a large business. Where was the protection for the public in such a case? That kind of thing was not to be supported. But if that was to be stopped they would have to put their own house in order before they could ask the Government and the country to help them. They ought to be rid of branch shops; there ought to be no shops managed by men who were not registered. They ought to do away with the executor clause, except giving a limited time to wind up, and to make it a personal business altogether. They should do away with wholesale chemists being allowed to carry on retail sales unless they were registered. In large businesses it worked all right, but there were many men in large towns who carried on business ostensibly as wholesale chemists who were drysalters, and who sent out poisons in small quantities. That was not fair; but if they were to put themselves right, and make this a personal business, they might go with fairness to the public and to the Government and ask to have some protection, and that in consequence of the examinations and all their responsibilities under the Acts of Parliament they should have a *quid pro quo*, and some protection against the general public dealing in the articles which they only were properly qualified to sell. These various difficulties under which they lay would, he felt sure, become more and more important when the Association was out of the way; chemists and druggists throughout the country would determine to build up an association, and it would simply result in a stronger, more powerful, and more representative body coming into existence. He could only say if such were the case he should be very happy in any way he could to further the success of the Association. He concluded by moving:—

"That the Chemists and Druggists' Trade Association of Great Britain be forthwith wound up, and that the Finance Committee be directed to take all necessary steps to that end; that the Treasurer be directed to hand over the surplus funds, if any, remaining in his hands, after satisfying all the liabilities of the Association to the Benevolent Fund of the Pharmaceutical Society.

Mr. HARRISON said Mr. Barclay had made the matter so clear that the Association must be wound up that he had very little to say, but, like Mr. Barclay, he felt that they did not for one moment wish to intimate that the necessity for the existence of such an Association had in any degree diminished. He believed the necessity for it was as great to day as ever, but they did not find the chemists and druggists throughout the country appreciate that; their numbers had dwindled down to such a small proportion, and the funds in a similar ratio, that they were utterly unable to proceed on the lines laid down, and it came therefore to two alternatives; one which had been before them a considerable number of years was a large increase in members, and the other was to raise the amount of subscriptions. They had tried again and again by various means to increase the number of members and failed, and they recently tried what could be done by larger subscriptions, and in that also they had failed. It was perfectly true that nearly 1400 came forward and said they were willing to continue with the Association and subscribe ten shillings, but that meant an income of £700 a year only to begin with, and they had to take into consideration that those who had come forward had been specially appealed to. They all knew from their study of voluntary societies that after the first year, unless something extraordinary happened, you might usually look for a shrinkage of members, and they felt it was utterly impossible to work an Association like that on £700 a year. No one had greater faith in voluntary work than he had, when you could get it; but it was utterly impossible to work such an Association on the voluntary principle. A letter had been published within the last few days in which it was recommended that the voluntary work of the Association should be largely increased. That letter only showed, the writer being a man of large business experience, how utterly those in the trade, outside the Executive, failed to grasp the amount of work which had been done. Mr. Barclay had shown what had been done in defence of prosecutions, but he had not told them as he meant that during the ten years they had given advice in no less than 5000 cases. It was a matter of fact that they had given advice in 500 cases every year. Now, could a Secretary be found who was prepared to give advice in 500 cases each year, and give all that time for nothing? It would take a man more than twelve months to learn the duties of the office, and be able to give that advice promptly when required, and after he had learned the work he would be displaced and a fresh Honorary Secretary called in. The matter was utterly impossible, and only showed more clearly than anything else how utterly the members failed to appreciate the work which had been done for them. Mr. Barclay had referred to some of the important work they had done, for instance, with regard to the Trade Marks Act, but in that they went further than he had indicated, for they had established with the officials of the department a thorough *entente cordiale*; so far that if they raised an objection to any trade mark the officials refused to allow it to be registered until they had had a further communication with them on the subject, and they admitted that the Association was of the greatest possible use to them. Chemists and druggists never made a greater mistake than when they allowed work like that to collapse for want of funds. Reference had also been made to the fact that all voluntary societies were suffering just now for want of funds, and he knew that to be the case; there was a very great depression in trade; but they also suffered from something else, namely, that there was no very great danger at the present moment imminent—they had done the work a little too well. They were in a similar case to a fire insurance company, which had had no fire in a town for a considerable length of time. He was told that where fires were of very rare occurrence fire policies were allowed to lapse to a very great extent, and he was told that companies found nothing in-

crease their policies so largely as to have a fire occasionally. They could not very well go round to their friends, the analysts, and ask them to institute prosecutions, but he felt convinced that the results would have been in their favour if they could have had a long series of prosecutions throughout the country under the Patent Medicines Act, the Adulteration Act, or the Apothecaries Act. The roll of members would have been largely increased, and instead of being there to wind up the Association they might have been there to extend the sphere of its usefulness. But they had to face the fact before them that only 1400 men were prepared to come forward and remain members, and under those circumstances it was utterly impossible to go on. His friend, Mr. Barclay, was of a more sanguine temperament than himself, but he had now come to the same conclusion, and that being so he thought it strengthened their case very much. He greatly regretted the result, but still he thought the best thing to do was to die and be respectably buried, because the day possibly was not far distant when chemists and druggists might rise up as one man and endeavour to form a new association to carry on the work they were doing. He was quite sure the necessity still existed, and that they would all feel it so before a very long period had elapsed. He seconded the resolution, not with pleasure, but with satisfaction, feeling that it was the right thing to do.

Mr. WYLEY said he wished to approach this subject without saying anything which could be construed as casting blame on the present Executive, but they were in the unfortunate position that the Association would have come under the notice of the Official Receiver except for the generous response which had been made to the circular they had issued. Looking back he felt a great deal of gratitude was due to the members of the present Executive and the officers who had so long borne the burden and heat of the day, and done such good work for the Association, but he felt that they lived in bad times ; in all classes of the community it was found necessary to cut down expenses, and above all he believed it was wise to live within one's income. For that reason he had taken the liberty, for the purpose of starting discussion, to write a letter to the *Chemist and Druggist* last week, in which he started the idea that if possible it would be well to try to work the Association on more economical principles, by extending the voluntary system. There were dozens of chemists in England at the present time who devoted a great portion of their leisure time to some philanthropic, municipal, or political work, and if some gentlemen could be found who would devote a few hours per week to the work of the Association, he felt sure that the expenses might be very much cut down. He was far from wishing to cast any blame on their worthy Secretary, or to say that the salary he received was too large for the work he had done, but when they looked at the balance sheet of last year, and saw that £339 was spent in salaries of the Secretary, etc. ; that the Auditors' charge was twelve guineas ; that the office expenses were a heavy item ; that £46 was spent in reporting, and that the postages were very heavy—though he could understand that, as several circulars were sent to the trade—looking at those things he could not help thinking that they were really spending more than their income, and that the principle of voluntary work might be very largely extended. In every district it would be possible to find local secretaries, men of ability, who knew the trade, and who would collect subscriptions and work up the Association generally. At the present time, no doubt, there was a great feeling abroad that the Association was doomed, and was going to be wound up. He knew this from experience, for gentlemen had said to him they did not intend to subscribe any longer because the Association did not do as much good as they expected. There was a certain amount of apathy in the trade, but it would be a great pity to wind up the Association, because it would be so difficult to start it again. Every effort should be made to keep it on its legs and if possible to put it on a sound financial basis. A certain percentage of the income ought to be spent in working expenses ; 15 or even 20 per cent. might well be spent in management. He did not want to detain the meeting by going thoroughly into the figures, and of course, as Mr. Harrison had said, he as an outsider did not know the amount of work that had been done. He had no wish to detract from the work that had been already done voluntarily ; he knew that the Local Urgency Committee in Birmingham had devoted a great deal of time to the work, and if that could be extended they might still have a strong and powerful Association. It was admitted on all hands that they must have a strong Association, which would take up all cases which came under their notice ; and if it were known that chemists would be protected in all cases except fraud, an enormous number of new subscribers would come forward. To test the feeling of the meeting, and feeling strongly that it was most undesirable to break up the Association which had done so much good work in the past, he would propose the following amendment :—

> "That six members of the Executive and six elected from the general body of subscribers be appointed as a committee with the view of reorganizing the Association on a more economical basis."

Mr. MACKENZIE said though a member of the Executive he could not agree with his colleagues in this matter, and go in for winding up the Association without another effort. He had heard the arguments of Mr. Barclay and Mr. Harrison, and he thought the meeting should pause before coming to a decision that the Association should cease to exist. Before hearing the amendment he had noted down that he would like a committee appointed—five representing England and one Scotland—to consider the matter. He thought the arguments which Mr. Barclay had used were the strongest he could use for the continuance of the Association for the defence of chemists generally. They had heard of a city being spared for the sake of five, and he would say for the sake of 1400 he would spare the Association. Fourteen hundred would still stand together as a very good nucleus indeed of continuity, which, when an emergency came, would be prepared to act. He held also that if they broke the continuity of their existence they would do more than could be redeemed in a considerable time afterwards. He would like the Association carried on with the distinct understanding that at all events if they were not so energetic and prepared to come to the House of Lords with all disputed cases, still they should form a nucleus round which members of the trade could rally. With 1400 members they would have an income of £700, and they might go on with that. They had not yet faced the question of cutting down the expenses, but this was one of the first questions which ought to have presented itself to practical men. If there was not sufficient for carrying on the Association on the basis on which they had hitherto carried it on, they ought to do with smaller expenses,—a smaller Executive would perhaps be adequate. Of course it was a good idea to have representation, and in better times it would still be admirable, but at the present it might be dispensed with to a very large extent and could be made a reason for not retaining the services of the Secretary as hitherto. They might get an Assistant Secretary for less than £100 a year, and by a smaller Executive, say of half-a-dozen men, who knew the whole working of the Association, and whose knowledge was worth a great deal, they might still continue. No doubt they lived in bad times, which affected them all more or less, and some very heavily ; but the moment it became an acknowledged fact that they had ceased to exist as a trade association, things would become worse. He asked them to consider well, before coming to a vote, how desirable it was to have a committee appointed with a view to continuing the Association at a reduced expenditure.

The CHAIRMAN said he did not wish to intervene personally in the debate, but he wished the meeting to have all the information which was before the Executive, and what Mr. Wyley had said reminded him that two officials, who had done work for the Association, the Treasurer and the Hon. Secretary, had both written resigning their offices in case the Association were re-organized.

Mr. LONG said if Mr. Wyley had not moved this amendment he should have done so himself. He had been on the stump in his neighbourhood, and he thought they ought to go on. They ought not to acknowledge such a defeat. He should say, if they had not strength enough to do much good, do not kill the patient, but let him live as long as he could. Many chemists in his neighbourhood had agreed to go on, and he believed if everyone would go round, his own neighbourhood and solicit his neighbours they would get a good response. The circular had been sent round but people received so many circulars they would not pay much attention to them. There was an immense amount of apathy, and the constant cry was, What did the Association do? He always said in reply, What have you done for yourselves? They knew very well that if all the chemists had come into the Pharmaceutical Society, instead of standing aloof, they would have got a splendid Act of Parliament, and if all the chemists would come and support this Association, a 5*s.* subscription would be ample. When people told him they could not afford it he said, Why? it was only a penny a week, and if necessary he would go round and collect it himself. He had met with a great amount of sympathy and also with a great amount of apathy, but they would never prosper as a body until they stuck together. One gentleman said he would subscribe if they would prevent the stores dispensing. He told him the best way to do that was to subscribe, and he thought they ought to make a vast effort to induce other chemists to join. He did not think that effort had been made. Mr. Barclay spoke about fighting the question of the stores, and really the decision was an absurdity. A more rotten judgment was never delivered than that about the lawfulness of the stores dispensing. The first thing the Lord Chancellor said was that this was an artificial person, but the only artificial persons he knew of were in the Marylebone Road, under the charge of Madame Tussaud. Then the Lord Chancellor said a company could not be examined. You had only to ask each member individually, and if they were not qualified it was an illegal conspiracy, and they heard a great deal about conspiracy in the present day. The next absurdity was to say because they could not comply with the law they were at liberty to break it. He did not think if the matter were put forward in a forcible manner it could be sustained for a moment. He begged leave to support the amendment.

Mr. CLARKE (Gravesend) said he felt very earnest about the continuance of the society, and he believed that if an effort were put forth by every individual member they would meet with a fair response. He believed the society was exceptionally fortunate in the Secretary, and to let a society of eleven years' experience go for want of a little extra struggle would be a great pity. He knew what voluntary work was himself to some extent and was willing to do anything he could. To let the society go and lose all the prestige they had attained when they wanted everything they could have in that way would be a great mistake. He believed these 1400 gentlemen, and he was one of them, would willingly make the subscription for the first or second year one guinea instead of 10*s.* if necessary, and he felt certain that out of the 1400—and he was surprised there were so many—there were many able and willing to assist further, and there would be no difficulty in getting an income of £1000 a year. He hoped the meeting would pause before coming to a final conclusion, because if they broke up they would have to begin all over again. He had seen some references to another institution being founded, but it would not represent the trade at large, but the Secretary and Executive. Everything depended on the Secretary, and though he had not the pleasure of knowing Mr. Haydon he had seen what work he had done and fully appreciated it. He was sorry to hear of the resignation of the Honorary Secretary and of the Honorary Treasurer, and hoped that if they saw a supreme effort was being made throughout the country they would reconsider their decision.

Mr. ALLEN said he rose with some hesitation to support the amendment because of the remarks which had fallen from two past-Presidents, who had proposed and seconded a resolution which really meant that the Association must die. The remarkable part of it was that every word Mr. Barclay and Mr. Harrison had uttered only convinced him that the Association could still live. If they had been proposing a resolution that it should still go on he could not conceive how they could have put the case more strongly than they had done. He was perfectly at one with both those gentlemen, that there was as great a need of the Association actively carrying on at the present moment as ever. He was perfectly convinced that many of the things of which they spoke needed the intervention of an association of some kind. He was also convinced that a defence association of some kind must exist in their business. With regard to the Trade Mark Act, certainly an organization of some kind should be in existence to watch that one thing alone. He could understand that, coming there and finding what a small number had attended in response to an urgent appeal of such an unusual nature as it was, the Executive, after ten years' hard work, should feel dispirited; but that was not anything unusual in any matter which was for the interests of chemists. The response had certainly been rather of a negative character, and with an income of £700 a year he did not see how the Association could possibly go on as it was now, but he should really like to consider some alternative proposition by which a smaller Executive could carry it on. He knew there was something behind which, perhaps, ought not to be discussed, but he was certain that nothing which was to a certain extent of the nature of private enterprise could be put before the country with the weight of that which had an elected committee however small. He hoped there was some life in the old dog yet.

Mr. HAMPSON said he was extremely unfortunate a short time ago in not being able to attend a meeting of the Executive when they had this grave question before them, whether they should recommend the Association to continue its existence or whether it should be decently interred. The voting on that occasion was extremely narrow, and Mr. Barclay, the valiant champion of dissolution to-day, was then on the other side. He should support the amendment or something equivalent to it, and his first reason was that they should not lose the services of the present Secretary. His second was that he believed the Association would still live if they were at all in earnest. The promised income was over £700, and he was told they might live respectably if they had a thousand. Surely with a little extra exertion they could get £1000. It had been said time after time that it was undignified to appeal to the wholesale trade, but the wholesale trade had been their friends in the past, aud he was quite sure they would still remain so. It was to their interest that the Association should live, and that the poor unfortunate chemist should not be too much badgered, but should be protected in the future as in the past. He was quite sure without any indecent handing round of the hat they would be prepared to give something more than the 10*s.* 6*d.* subscription. But even with that alone, and a certain number of guineas which would come in, £1000 could be obtained. A great deal had been said upon the impropriety of killing an Association which was not yet dead, but

they were called upon by Mr. Barclay, who was really the father of it, to kill it outright that very afternoon. He took exception to that act which they were asked to perpetrate. He would not say it was indecent on his part, but at any rate it was unexpected that the very man who in early days had worked so hard for it should now wish to put it out of its painful existence. He appealed to him to stay his hand for a short time and let them have another attempt at life. Times were bad, but they would not improve the times by separating and not sticking together for self-protection. It was a shame they were not much stronger. Even the much respected working men banded themselves together for self-protection, but an educated body, sometimes spoken of as a profession, was unable to stick together and raise £1000. It seemed to him positively astounding and he would not believe it.

Mr. HART (Manchester) said he felt sure that if the Association were allowed to die they would make a grand mistake. They had at all events some little life to foster, and if it died the whole thing would have to be gone through again. His friends in Manchester told him that under no circumstances was he, if he could help it, to allow the Association to lapse. There were only forty-one replies to the circular from Manchester, but it must be remembered that people were pestered to death with circulars, and if they wished it to live they must have a personal canvass. He had drafted a few ideas on the subject, but they were much to the same effect as had been suggested by Mr. Wyley. He felt quite sure the trade would make a great mistake if they allowed the Association to die out. Mr. Barclay had given very excellent reasons why it should be continued, and he was very much astonished when he moved his resolution, because it did not at all tally with his speech. He felt quite sure that he only did so as an act of duty to the Executive, being put down to do it, not because he was convinced. If the Association were reformed it must be first of all on a reduced expenditure, and he felt quite sure they might rely on the services of Mr. Barclay in the future as in the past, and though he had moved the resolution he did not think he meant it.

Mr. GLOVER said he should like to show the necessity for such an Association by giving the particulars of a case in which he had been himself interested, and which he had written down. He proceeded to read certain details of a case of prosecution under the Apothecaries Act, but was called to order, and the Chairman ruled that he could not allow details of personal cases to be gone into.

Mr. JONES said he was a member of the Executive, but he should support the amendment. He had voted at the Executive for the Association to hold on. But how could it hold on when it could not get funds? It was true that a personal canvass would do good, and he could say that, because he had done a little himself in that way. Chemists of course, as a class, were an unmovable sort of people, unless there was something stirring going on, but at the same time they liked some representative of the Association to call on them. They liked to see some one now and again from the society. If they allowed the Association to drop, they would be attacked on all sides, for if people attacked them before, they would do so twice as much afterwards. He wished Mr. Hart had canvassed Manchester, as he had promised at the Executive.

Mr. HART said there was a formal resolution passed, asking him to do it, but when the minutes were published, no mention was made of that resolution, and consequently he felt he would be going about without any authority.

The SECRETARY said he would answer that at once, because it was impeaching the character of the office. Mr. Hart, at the last meeting but one of the Executive, suggested that he should be allowed to collect the Manchester subscriptions, and it was agreed that he should do so. There may have been a formal resolution, but so far as his memory served him, it was simply a minute, which appeared on the minutes of the meeting, and he did not think it was of sufficient importance to put in the trade journals, that a gentleman residing in Manchester was going to collect the subscriptions. Mr. Hart had perfect authority from the Committee to do it, but he now came and said because that was not published in the trade journals he was not authorized to canvass. If that was what was meant by a personal canvass the less they had of it the better.

Mr. JONES said he went to canvass, and the result was fairly satisfactory, and if the Association were carried on he should be prepared to go on canvassing. They wanted more members. One gentleman said he was surprised to find 1400 come forward at 10*s.* 6*d.* each. That was not to be laughed at. He agreed with Mr. Mackenzie that a smaller Executive might do, but with regard to the figures that had been read he thought they were not those of last year, but the year before. Last year the expenses were very small, because the Urgency Committee did a great deal and saved expenses. With a smaller Executive, made as representative as possible, and with the expenses cut down, he felt certain they would be able to carry on the Association. He firmly believed that without the assistance of the Association they would be very much harassed. It was all very well to carry an Act of Parliament to say nobody should sell poisons; but what did they care about selling poisons? You could not make a fortune at selling poisons. They ought to look at the grocer who was selling patent medicines at store prices.

The SECRETARY said he was anxious that the meeting should not be misled with reference to this question of personal canvassing; the last speaker said he had canvassed——

Mr. WYLIE asked if this was in order. They did not want a discussion on canvassing, and he thought personal matters should be left out.

Another MEMBER said he was very sorry that the meeting had not heard Mr. Glover's case in full.

Mr. ANDREWS supported the amendment. Much of what he could and would have said had already been put before the meeting in better terms, but he hoped gentlemen would understand the amendment before them, namely, that six members of the present Executive and six chosen by the society at large should meet together and discuss amongst themselves how the Association could best be carried on in the future with more voluntary effort and less expense. With £700 income they could not do very much work, but they could live and carry on, unless something startling occurred, which was very likely to be the case, as the Apothecaries' Company appeared to be very active, and inclined to attack them in the most vital point, that of counter prescribing. If such a thing occurred there would be no difficulty with regard to funds. He believed he could have got a great many names, but he was met with the objection that the Association was going to be wound up, and of course under those circumstances canvassing was carried on under great difficulty. He was told that London was not sufficiently represented, and he thought if these twelve gentlemen could see their way to making an honorary secretary for London, with whom gentlemen can communicate in case of difficulty, that would have a tendency to remove the feeling that this was only a Birmingham Association.

The CHAIRMAN said he could not allow the discussion to conclude without a word or two. It had given him a great deal of pleasure to find that nearly everyone had spoken so kindly of the work done in the past by the Association, and it was very pleasant to hear so little blame attached to those who had carried on the voluntary work in the past. But he must say that a feeling of another kind came across him when he felt how im-

possible and almost impracticable the amendment was; for as far as he could see it was impossible to carry on the Association, unless something very different turned up. Look at the meeting itself, when there was a question of this importance to be debated, and see how easily they could count the few people present. Did that look like going on? He was afraid it did not, and when he looked at the statistics of the question, he found that in the largest city of the world, in which 1200 chemists carried on business, only 209 came forward to say they would subscribe 10*s.* 6*d.* a year towards helping those who wished to protect them. In another large city where 182 chemists resided, 63 came forward after a considerable canvass had been gone through; in another town with 82 chemists 13 only voluntarily joined the society; in another town there were 97, of whom 16 said they would join; there were 213 in another city, out of which 31 said they would join; in another 235, out of which 41 sent in their names; in another out of 90 only 19; in another large town of 41, 12 came forward; out of another large town 7 out of 143; and out of a whole country, a nation in itself, with 780 chemists carrying on business, only 31 sent answers to the circulars. It might be that they were pestered to death with circulars, but it did not look like carrying on. He should be glad if the meeting could prove otherwise. But he only rose for the purpose of explaining the vote he should give for Mr. Barclay's motion. Of course they could raise £1000; they had raised sufficient money from time to time, but how had it been done? By making every possible effort all round, imploring their fellow tradesmen to defend themselves, and when that did not prove sufficient they lived on the money which wholesale firms had been good enough to give them. Could they go on honestly and be said to represent the calling if they lived on such ephemeral support as that? The meaning of the resolution was that it was far better to let the Association die, and to let the greater need become apparent for its resuscitation. Then the chemists and druggists would rise as one man and say they would have an association, for they might depend upon it when they really felt the need they would support it. He was very sorry to have interrupted Mr. Glover, but he would point out to him that it was impossible to discuss private matters there. If Mr. Glover had simply given an outline of what he had to say, no one would have objected to hear him, but when they saw a large sheet of foolscap, closely written, it naturally made them think of the time which was going to be consumed, and if they listened to one private explanation another would be sure to crop up. He agreed that Mr. Barclay and Mr. Harrison's statements were very powerful in favour of the amendment, but, on the other hand, the gentlemen who supported the amendment had spoken with equal force in favour of the motion, for they had, one after the other, got up and described the very methods which had been adopted in the past. They had left the room after each annual meeting firmly resolved in their own minds they would carry out those methods, yet by the time the next annual meeting came round, unless there was some scare meanwhile, they found themselves poorer than ever. They were all grateful to the 1400 who had sent in their names, but to them, and to them alone, they would have to look for permanent support. When the time came, and chemists themselves felt the use of an association, and they must feel it soon, they would come forward and support the Association, and not only support it with just temporary subscriptions, but take care that it did not die in their day and generation.

Mr. Smith said in the first place circulars had been sent round by Mr. Haydon intimating that the Association was going to be wound up unless they subscribed 2*s.* 6*d.* That naturally frightened them, and some friends of his sent the 2*s.* 6*d.* in the first place, but the second circular went into the fire and was never responded to, because they said, What was the use of subscribing to a society that was bankrupt? And this was to some extent natural. The game of funk which had to a certain extent been played had frightened the chemists. The amount represented by 1400 persons who had promised 10*s.* 6*d.* each was not what might have been got if the Assciation had showed a bold front and a little more go. It looked like being wound up, and the chemists naturally said, Why should we support it? But very probably if other tactics had been pursued more than 1400 would have come forward. He did not see why the local secretaries of the Pharmaceutical Society, who had any sympathy with the Association, should not be asked to do all they could and use what influence they had to enable the Association to go on.

Mr. Walker said it seemed to be the idea of some gentlemen, that the members of the Executive were so sure that the society would die, that they would rather strangle it than it should linger on. Although Mr. Barclay was his trade opponent he was glad to call him his friend, and the greatest credit was due to him for the work he had done for the trade, and if he were prepared to strangle his own child, knowing the child was going to die, they might be very sure that the child was in a very bad way. It should not go abroad that the Executive were desirous that the Association should die; on the contrary, they had turned over in their minds all the schemes which could be proposed for keeping it alive. But they failed to see the possibility of its continued existence, and it was certainly more in sorrow than in anger they had come to the conclusion they had. He was glad that Mr. Wylie had come forward with his amendment, but he feared that if he and others who supported him had had the privilege of being on the Executive, they would not have brought it forward. All the methods they recommended had been tried, all the suggestions which could possibly be made about voluntary efforts being increased and expenses diminished had been made, and the result seemed to be, that no responses came to the circulars, however urgently they were worded, and therefore they assumed that the trade took no interest in the matter. There could be no question that some such society was needed. He was quite sure that the gentlemen present, if they agreed to the amendment, were determined to carry out the promises they had made, and that might have some effect on their neighbours, and if they did so perhaps some further result would be attained, but a solemn warning should be given to them. If after the three or four urgent circulars that had been dispatched the trade would only respond to the noble tune of 1400, it was clear evidence that it took a great deal to shake up the interest of the trade in anything at all. He therefore warned those who proposed the amendment that they were entering upon a heavy task, and he hoped they would be able to carry it out.

Mr. Symes said after the encouraging words which had been spoken by members outside the Executive he should be sorry to appear to throw cold water on the amendment. It was very encouraging to hear the remarks which had been made, but the figures given by the Chairman were very discouraging. They used to have a large room pretty well filled for their meetings, but to-day there were but a few, although they were all in earnest, and great credit was due to them for coming forward to help the Association; still, the evidence in all directions went to prove that they must have numbers as well as earnest men. They might have large numbers of earnest men who, no doubt, would be willing to pay one guinea, or even two, to keep the Association going, but it was not a question purely of amount, it was a question of numerical strength. One of the towns mentioned which had 200 chemists, 30 of whom subscribed, was, he was sorry to say, Liverpool; but the facts were not strictly accurate, because there were 300 chemists there, and, therefore, only 10 per cent. had come forward. He commenced to canvass, and he thought he should have met with a fair

amount of success, but when it came to such a critical time, he felt it was unfair to collect money if the Association was going to be wound up. There was no doubt that personal efforts would result in a larger number of subscribers, but the same energy must be kept up in getting in the subscriptions year after year, and he was quite sure that they would grow tired, as the Executive had, in trying to keep themselves going by the aid of money obtained by pressure in that way. It appeared that the work of the Association, whatever it had been, unless it came home very close to each individual, did not affect him sufficiently to induce him to subscribe; and therefore, while regretting very much that the Association should have to come to an end, and expressing his sympathy with the 1400 who wished to keep it going, he was very much afraid that the only course would be to wind it up. He believed its influence would continue long after it had ceased to exist, and he could prove that this had been so with regard to the trade marks question. Some time ago he saw the comptroller, who, without knowing that he belonged to the Association, told him that he had been very largely assisted by an Association whose office was at Birmingham. He said that he was not acquainted with the technicalities of each particular calling, and could not always decide whether a trade mark was good, but he had been much helped by this Birmingham Association, which seemed to understand all about it; and he was very sorry they did not communicate now. That was a purely voluntary statement which showed the good work which had been done. They could not have gone on for ten or eleven years without producing an effect which would last some time, but until they had stronger evidence of a proper recognition of the necessity for the existence of the Association, he believed all they could do was to discontinue the work. In due course no doubt there would be a reaction, pressure would be put upon them in consequence of some prosecution, and the result would be that some other association would be formed, if the work was not otherwise done. He had made these remarks as an explanation why, against his desire, he should have to vote for the Association being wound up.

Mr. BARCLAY said he had been very much pleased with the discussion. It was very gratifying to every member of the Executive to hear the flattering testimonials given to the usefulness of the Association, and to see the strong desire which existed not only there, but outside, amongst a large section of chemists and druggists, that the Association should continue to do its work. He only wished he could see his way to the work being carried on vigorously, because he knew the trade would suffer unless it had a representative organization. But he would say in reply to Mr. Wyley and others, that every suggestion they had offered for making the Association more vigorous and increasing its funds or diminishing its expenditure had been considered over and over again. They had asked the Local Secretaries to take up the matter, vigorous appeals had been made at the annual meetings, asking them whether they could not get more subscribers, and so on. With regard to the voluntary Hon. Secretary, Mr. Harrison had already answered that suggestion; they wanted not only a secretary who would give time, but a man who had the capacity and who would make it his business—who would think about it and practically nothing else; and who had the whole work at his fingers' ends. It was impossible to get an Honorary Secretary who would do this work, and it was impossible to cut down the expenses of the Association if they were to do the work on anything like the lines on which it had been carried on. It was impossible in a large meeting to go through the accounts and canvass each item, but every one could be thoroughly defended. The expenses of the office and Secretary were £339; and what was that to keep the books and attend to all the *minutiæ* of the business? They had heard there were 5000 answers to questions, and besides that there were loads of correspondence and an enormous amount of work in keeping the whole thing going. £339 was nothing for such work. Then there was the auditors' fee; they would have deserved reprobation if they had not spent it. They had had the first accountants in the town to audit the accounts, and then they felt that their financial position was as clear as noonday, and they had obtained that advantage for £12. He did not think anything of any association which had not good auditors; it was always open to suspicion, and if they had followed a different course, instead of praising the Executive they might have been bringing them to book for some lapse which might have led them into a large deficit. Then the reporting had been spoken of; but it was of the utmost importance that they should have clear reports of legal proceedings which took place in the police courts, because they never knew when a case was going to be appealed, and necessarily, therefore, the reporting expenses were considerable. They could not be cut down, and if they only knew the amount of reporting which had been done they would not find fault with the expenditure. The expenses of the Executive came to about £90 in the year. They had not met often; the members had not insisted on meeting, but had been ready to come when asked. They had not been called together except in great emergencies, and so the expenditure had been kept down. To have an Executive Committee of twenty-four men from Scotland and all parts of England, and only to pay £90 for it, was, he thought, very cheap at the money. They might reduce the Executive and make it a small one, but it would not then be representative; it would only be a small syndicate, which would not represent the popular opinion of the country in any great question affecting the general interests of the trade. Mr. Hart said he could get 150 names in Manchester, but they had only received 41. He wished the 150 had come; and they would have all rejoiced to find that there was one town standing by them. Something had been said about London, the great metropolis, and the place where they were accustomed to look for light and leading. London had done very well in this matter; they had 209 promises at 10*s.* 6*d.* from London, whilst at Glasgow, on a similar occasion, after the whole trade had been appealed to, they only got 140 at 5*s.*

Mr. ANDREWS remarked that that was no criterion of what might be done.

Mr. BARCLAY said he wished they had some opportunity of testing that. If they could adjourn the meeting, or do anything which would give the trade another chance, he should be only too glad. If Mr. Harrison would agree to it, he should be quite willing for the resolution and the amendment to drop, and let the whole thing stand over for, say a month.

Mr. LONG: Until after the Jubilee, and have a Jubilee appeal.

Mr. BARCLAY said the resolution might drop, and a resolution something of this sort might be passed:—"That in the opinion of the meeting it would be a disaster to the trade that the trade organization should fall to the ground, and that the Local Secretaries throughout the country be requested to organize a canvass of their respective districts, and send in within a fortnight, or a month, a list of the members who would be prepared to pay 10*s.* 6*d.* a year in case the Association went on." Mr. Hampson, however, who had had a great deal of experience, suggested what were they to do for money in the meantime.

Mr. CLARK said the meeting might guarantee it.

Mr. BARCLAY said that would settle that difficulty. He supposed they would require £100.

The SECRETARY: More than that, if circulars are to be sent to the trade.

Mr. LONG said there was no necessity to have more circulars; let the members do it themselves.

Mr. BARCLAY remarked that the members must be asked to do so. If their friends present, representing

the trade journals, would guarantee that every member of the trade should have a copy of the proceedings, they need not spend money on circulars. Some one had said that he had been speaking against his own resolution, but he spoke more emphatically now. If the meeting were of opinion that the Association should go on, and would send a manifesto out to the country requesting the Local Secretaries to canvass the members in their districts, he felt quite sure that the Association would not only go on, but go on more vigorously than ever. If Mr. Wyley would withdraw his amendment, and Mr. Harrison would agree to withdraw the motion, and then a resolution were passed such as he had indicated, and the meeting pledged itself to raise the sum of £150 to pay the expenses if need be, they might all go home happy.

Mr. SYMES feared they would not get another meeting in a month.

Mr. BARCLAY said it was not necessary. If the 1400 were made up to 2000 by the extra canvass, no doubt the Executive would feel justified in going forward.

The CHAIRMAN asked Mr. Barclay if he would feel justified in going on, if they got up to 2000.

Mr. BARCLAY said one would think the Local Secretaries were going to put their heads together and take care not to send up a single name beyond the 2000. He took it if they got 2000 they would probably get more. They would either get below the number or above it; either the trade would rise to the position or do as it had done in the past, give a negative response.

Mr. MACKENZIE pointed out that under the rules the subscription was 5*s*. They could not continue the Association and over-ride the rules.

Mr. HARRISON said Mr. Barclay had appealed to him to consent to withdraw the motion, but he did not see how that could be done. The meeting was called to consider that very motion, and it must be voted upon; they could not withdraw it and submit something entirely different. He would ask Mr. Barclay if he thought it a prudent thing to do. After the months of perpetual canvassing they had had, after a meeting had been called with ample notice to take into consideration the expediency of winding up the Association, what did they find? A number of earnest men, whose presence he gladly welcomed, had come forward, but were there a sufficient number to warrant them in carrying on the Association? They required at least 2000 and they had about fifty present. It might be taken for granted that those who were thoroughly in earnest had come, and he saw nothing in the number attending the meeting, nor had he heard anything in the arguments used, to warrant him in acceding to Mr. Barclay's request, even if it were in order to do so. Not a single suggestion had been made which had not been already acted upon, and much as he regretted being driven into this position he did not see any way out of it, consistent with the satisfactory conduct of the business. He would submit to the Chairman that the resolution must be voted upon.

The SOLICITOR (Mr. Glaisyer) said the meeting was called to consider the expediency of winding up the Association, and to take such action thereon as the meeting might determine. It was quite open to them to adjourn for a month if they thought fit.

After a little further discussion as to the best course to adopt,

The CHAIRMAN put the amendment, which was carried by 23 votes to 6.

Mr. HAMPSON said before the Chairman put the amendment as a substantive resolution he would move an amendment to it, which he thought would best meet the circumstances of the case, viz. :—

> "That this Association be carried on for twelve months at a subscription of 10*s*. 6*d*. per annum, and that the Executive Committee be requested to continue their efforts to sustain it."

That would leave the Executive with a free hand.

Mr. ALLEN seconded this amendment.

Mr. BARCLAY said he should heartily support it.

Mr. MACKENZIE hardly thought this was such an amendment as could fairly be put against the one already carried.

Mr. HAMPSON said if Mr. Wyley's amendment were carried out, they would have to appoint a Committee to alter the rules, to call another meeting to receive the report of the Committee, and so on; all of which involved expense. If they decided to carry on, they must at once begin to collect money, and let it be known that they intended to live.

Alderman MALTBY (Lincoln) said this was a much more practical motion than the former one, and he should support it.

The amendment was then put and carried by 24 votes to 2. On being put as a substantive motion it was agreed to *nem. con.*

Mr. BARCLAY moved a vote of thanks to the Chairman, which was seconded by Mr. HARRISON, and carried unanimously.

The CHAIRMAN in acknowledging it, said he could only hope that the resolution which had been come to would be carried out to a successful issue.

Proceedings of Societies in London.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, on June 16, at 4 p.m.

Present—Mr. Atkins, President, in the chair; Messrs. Attfield, Benger, Carteighe, Davies, Gerrard, Plowman, Williams and Woolley, Dr. Thresh and Mr. W. A. H. Naylor, Hon. Gen. Secs., and Mr. W. H. Ince, Assist. Sec.

The minutes of the previous meeting were read and confirmed.

Letters regretting inability to attend, were read from Messrs. Barclay, Conroy, Dott, Groves and Umney.

Mr. Woolley reported that the Local Committee had obtained permission to hold the ensuing Conference Meeting in the Owens College, Manchester; that a number of beds had been secured at the Grand and Victoria Hotels; that arrangements had been made to hold the Reception and Conversazione at the Grand Hotel, and for the members to visit the Exhibition and Botanical Gardens at Old Trafford, and that it had been decided to take the members and friends on the Thursday to visit Matlock, which is the centre of an exceedingly picturesque locality, and possesses ample accommodation for entertaining large parties of visitors.

Mr. Benger also spoke of the arrangements at Manchester being in a forward state, affording every promise of a successful gathering.

Dr. Attfield proposed, and Mr. Williams seconded, that the general arrangements submitted by the deputation from Manchester be adopted, and that the details be left to the Local Committee, in correspondence with the General Secretaries.

A suggested list of officers for 1887-8 was considered, and the resignation of Mr. W. H. Ince, the Assistant Secretary (who is leaving England shortly) was accepted.

It was announced that the following donations had been received, and the thanks of the Committee were accorded to the respective donors:—Report of the Illinois Board of Pharmacy; the Pharmaceutical Register, from the Pharmaceutical Society of Great Britain and the Pharmacy Board of Victoria; the Calendar of the Pharmaceutical Society of Ireland; Proceedings of the American Pharmaceutical Association; the Proceedings of the Chemists' Assistants' Association; Een Benzoek aan 'slands Plantentuin te Buitenzorg, by J. F. Eijkman.

Letters of thanks for Year-Books were read from several pharmaceutical societies and libraries.

An application from Mr. W. Elborne (Owens College) was then read, for the sum of £5 for a further research on "Strophanthus and Strophanthin."

Proposed by Mr. Benger, seconded by Dr. Thresh, and carried unanimously that the grant should be accorded.

Thirty-one gentlemen were duly nominated and elected members of the Conference.

UNIVERSITY COLLEGE CHEMICAL AND PHYSICAL SOCIETY.

On Thursday, the 16th inst., Professor A. W. Williamson addressed "A Few Words on Atomic Motion" to the University College Chemical and Physical Society. Referring to the atomic theory as the landmark from which he started in his remarks, he defined atoms as the present limit to all efforts to break up matter, and called attention to recent attempts made to decompose atoms, but did not enlarge upon these as being beyond his subject. Physicists, he said, have put forward several hypotheses concerning molecular motion, but although the motion of atoms has been observed in an infinite number of cases, yet this subject has not occupied so much attention as he ventured to think it is predestined to occupy as a matter of fundamental importance. Atomic motion, however, has been studied in some of its phases, and the very basis of the explanation of all chemical reactions he considered to be a recognition of the fact that atoms move either singly or in groups. Thus, for instance, the formation of a precipitate on the mixing of two solutions of different bodies is a proof of an atomic movement having taken place. This movement has been regarded as due to a predisposed affinity between two atoms, but Professor Williamson in his remarks gave reasons in support of another theory. In the accepted explanation of diffusion of gases, molecules are regarded as being in a state of constant motion, and, therefore, it is quite probable that atoms may have an inherent motion apart from outside influences. In the manufacture of ether by the action of sulphuric acid upon alcohol, the first reaction that takes place is between one molecule of alcohol and one of acid, and in the case of ethylic alcohol, one of the atoms of hydrogen of the sulphuric acid is replaced by an ethyl group, with a consequent formation of ethyl-sulphuric acid. In the second part of the reaction, another molecule of alcohol is introduced, and now the opposite interchange occurs. The ethyl group which had formerly replaced an atom of hydrogen in the sulphuric acid is now replaced by an atom of hydrogen from the hydroxyl of the alcohol, causing a re-formation of sulphuric acid. This fact, then, disproves any predisposed affinity, as the character of the change is altered according to the quantities of the ingredients entering into the reaction. If this be so, why, Professor Williamson asked, should the principle not hold good in other cases? Then he went on to assert that he considers in all reactions, that a counter reaction also occurs, except, perhaps, where precipitates are formed, in which case the bodies are nearly out of contact, and so any reversing change is retarded. But in a reaction represented by the equation $KNO_3 + HCl = HNO_3 + KCl$ he considers that under suitable conditions a reverse movement of the atoms would take place, resulting in the re-formation of the original nitre and hydrochloric acid. Further, he supposes that in all cases both decomposing and reproducing changes take place, but that the motion of the atoms is more rapid in the decomposition change than in the reproduction. Professor Williamson moreover supported his theory by discussing the condition of substances in solution, asserting that by solution a change is effected in the constitution of a body. Dry chlorine gas has no effect upon litmus, but in the presence of water the vegetable colouring matter is bleached. This bleaching action of chlorine water he suggests is due to an atom of hydrogen in a molecule of water being replaced by an atom of chlorine, forming hypochlorous acid, the nascent hydrogen combining with another atom of chlorine. In all cases of solution Professor Williamson says some such change goes on, and that even a solution of salt in water may be regarded as the formation of sodic hydrate and hydrochloric acid, as shown by the equation $NaCl + H_2O = NaHO + HCl$, although it is difficult to find evidence in proof of this. If, however, the atom of sodium be replaced by the ammonium group, some support is given to this view, as on boiling a solution of ammonium chloride evidence is obtained of the presence of free ammonia, and even when the acid is in excess, a perceptible quantity of ammonia is obtained in the distillate. Professor Williamson also gave other examples of solution which he considered to afford clear and unmistakable evidence of atomic motion in the effecting of solutions, thus a solution of oxide of magnesium in hydrochloric acid, when evaporated to dryness, readily yields up its hydrochloric acid. Again, when ferric chloride is heated to dryness, hydrochloric acid gas passes off, leaving a residue which consists mainly of the oxide of the metal with a slight admixture of the salt. Professor Williamson concluded his address with a few final remarks as to the nature of atoms, but here, as he said, the borderland of imagination was reached.

Parliamentary and Law Proceedings.

Supposed Poisoning through a Mistake.

The Leeds Borough Coroner (Mr. J. C. Malcolm) held an adjourned inquest on June 15, touching the death of Sarah Ann Parry, aged 24.

The Coroner said that a *post-mortem* examination of the body had been made and a portion of the contents of the stomach forwarded to Mr. Scattergood, who would analyse it.

The following additional evidence was given: —

Elizabeth Dixon, said that for three years she had known the deceased very well. She was with her last Friday morning, in her own house. Deceased told her that she was about to buy two pennyworth of pennyroyal, as she had a pain in her inside. She had a bottle on the table, and it was the same that the poison was found in afterwards. There was a label on it, bearing the name, "Mr Smith, chemist, Beeston Hill." Witness had seen the bottle at deceased's house many times before, and her son had often bought pennyroyal for the deceased in it. She and the deceased left the house together, and witness went to a shop for flour. She saw the deceased go into the shop of Mr. Slater, chemist, and come out again. When witness arrived home she saw the deceased in the doorway, just on the point of falling. She ran up and caught her, and the deceased said that she had drunk the contents of the bottle, and it was not pennyroyal but poison. She said that it had been given to her by a lad of 16 years of age, with black curly hair. Witness gave her some water, and a little brandy, and the deceased said that her legs were stiff, and had gone dead. She remained with the deceased until she died. Deceased had taken pennyroyal very often, and on the morning in question she was cheerful and in good spirits.

By the Jury: That was the only bottle she had ever seen in the deceased's house. Deceased said that she had drunk out of the bottle, and was sure that she was poisoned, as she had taken pennyroyal too often to be mistaken. Deceased had always formerly got the drug from Mr. Smith, whose name was on the label, for about six months.

Annie Foster, deposed that she had been a very intimate friend of the deceased's, and last Friday she had breakfast with her in her house. The deceased told her that she had a dreadful pain in her back, and that she was about to buy some pennyroyal. Deceased had not any money to buy flour with, and witness lent her a 2*s*.-piece. Later on in the morning she was fetched in to see the

deceased, and found her suffering dreadfully. She heard the deceased tell Mr. Shirley, surgeon, that she had been to Mr. Slater's shop, and had been served by a boy.

By the Jury: She looked in all the cupboards, but could not find any suspicious-looking bottles.

Emma Lavinia Bellwood stated that she saw the deceased last Friday standing in the doorway looking ill. She asked her if she was ill, and deceased said that she was much worse, her legs being dead. She got her some water, and deceased told her that she had taken some pennyroyal, but it must have been poison. She had got it at Mr. Slater's shop, and a boy had given it to her. She then went for a doctor.

Elizabeth Pollard, a widow, said that on Friday morning last she went into Mr. Slater's shop, and as she was coming out a young woman was going in. She heard her ask for twopennyworth of pennyroyal. A young man was serving in the shop. Since then she had heard of the death of the deceased, and her description answered to that of the young woman she had seen in the shop.

Police-sergeant Chapman stated that he received information of the case, and at once went to make inquiries. He visited Mr. Slater's shop, and saw the assistant, Arthur Clay, who said that he had heard of the death of the deceased. She had been to the shop for twopennyworth of pennyroyal, and had a bottle bearing the label of Mr. Smith.

Inspector Sykes, the coroner's officer, said that he went to Mr. Slater's shop on Monday night last, and bought twopennyworth of pennyroyal, in order to have it analysed. He gave notice that no more of the drug had to be used. He saw Clay, who said that he had put a label on the bottle, and had wrapped it up in a red bill.

Mr. John Slater, chemist, of Malvern Road and Beeston Road, stated that Arthur Clay had been in his service for about fourteen months. The young man had attended principally to the Beeston Road shop. He had tincture of nux vomica which was kept among the other tinctures, and not anywhere near the essence of pennyroyal. He had no strychnine at all, and had only had about one drachm in the Malvern Road shop during the twenty years he had been in business. Strychnine was a colourless liquid, and nux vomica was brown. Strychnine was a preparation of nux vomica. "Vermin killer" was the only drug he had that would have produced the same effects as those observed. There was no bottle missing from the shop. On Friday last he went to the deceased's house, and Mr. Shirley gave him a bottle and asked him what it contained. He said it was like pennyroyal, but after he had tasted it he said that it was strychnine. It was a one-ounce round-shouldered bottle. He saw a woman go out of his shop on the morning in question, and went in and asked Clay what he had sold her. He said that she had been for 3*d*. of pennyroyal. He asked Clay, after the death, why he had not put a label on the bottle, and Clay said that he had done so. He looked in the till, and saw that there was no silver, only copper.

The Coroner said that he would not call Clay then, as he knew what he would say, but would give him time to consider it, and hoped he would tell the truth.

The inquest was adjourned until the 24th inst.—*Yorkshire Post.*

Action against a Chemist for Negligence.

At the Leeds County Court on June 15, before his Honour, Judge Greenhow, Mary Birch, dressmaker, wife of John Birch, of 9, Springfield Place, Woodhouse Hill, Hunslet, sought to recover from A. Wood, chemist, Church Street, Hunslet, £16 5*s*. as damages for injury sustained by reason of the defendant's negligence in supplying a compound called tincture of steel instead of tincture of myrrh, the plaintiff, it was alleged, being caused illness by taking the wrong medicine.

Mr. Foster conducted the case for the plaintiff, and the defendant was represented by Mr. Warren.

It appeared, according to the case of the plaintiff, that on November 10 last, the plaintiff was indisposed owing to a cold, and determined to procure some tincture of myrrh in order to attempt a cure. She sent to the defendant for the drug, and took a dose of a teaspoonful of what she was supplied with, sweetening it with sugar. She experienced a different taste to what she had been accustomed to with myrrh, and went to the shop and inquired what she had been served with. She was told "Tincture of steel," and thereupon left the premises. A few moments later, however, she was taken very ill and rendered speechless until the Friday night following. An illness of six weeks' duration supervened, plaintiff vomiting frequently and suffering from fits. During this time the business suffered, and at least £15 was lost in this manner. Plaintiff was so ill that she was confined to bed, and had to be attended by Dr. Nicholson.

Evidence was called in support of the plaintiff's case; and Mr. Warren, in defence, argued that when the plaintiff's messenger came to the shop she asked for a pennyworth of tincture of steel, and she was supplied with the article. He (Mr. Warren) believed that a label was placed on the bottle, but shortly afterwards plaintiff came into the shop and asked what the defendant had sent her. He replied, "Tincture of steel," and she said she required "tincture of myrrh." She received the drug, and went away. A printed label, bearing the words "tincture of steel," was placed on the bottle she received first.

After hearing witnesses for the defence, his Honour ultimately gave a verdict for the plaintiff for 15 guineas and the costs.—*Yorkshire Post.*

Correspondence.

*** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Unfair Competition.

Sir,—In criticizing my remarks on this topic two correspondents have objected to my use of the word "luck" in referring to the manner in which many of the Society's certificates are obtainsd. But they have unduly magnified the extent to which my words were intended to apply. I was thinking of those who had received little or no pharmaceutical training during pupilage, and who had depended upon the scanty stock of facts and outlines of principles, gained during a limited period of "study" under an "irregular" teacher, to fit them for acquiring certificates. No accusation against the examiners was meant or implied. I believe they perform their difficult work in an efficient manner, but yet I feel sure ill-prepared men often pass. I presume that those who gain a certain percentage of marks must be passed, and some skilful teachers take great pains to acquire a knowledge of the examiner's idiosyncrasies in questioning and prepare their men accordingly. Will anyone venture to assert that success gained in the examination room after a three months' course of preparation, unprefaced by any previous study of the necessary subjects, but so arranged that the probable interrogations are guessed at (after comparing former candidates' experience) and carefully worded replies framed and used as notes by examiners, can be dignified by any worthier phrase than "mere luck"? That such instances occur is notorious, and considerably less than three months often suffices for ignoramuses with extra good memories to deceive the examiners. But my meaning should be

quite evident without any illustration, and, besides, this is quite a side issue not at all affecting the main point under discussion.

Mr. Ebbutt's sympathy with the youths who scramble for facts is highly praiseworthy. But what is the use of scrambling for what is beyond reach? Encourage "scrambling" for facts by all means, but do not let this serve as an excuse for the non-performance of one's duty. I contend that facts, duly organized, should be placed before these youths in a systematic manner by all pharmacists professing to instruct apprentices in the methods of their business.

Again, Mr. Ebbutt asks that the sphere of the Pharmacy Act be extended. Does he really suppose that we should benefit much were examined men alone allowed to retail drugs? Is it unreasonable to fancy that as great evils as now are would then exist? Those who depended least upon the sale of dru s would retail them at an extremely small rate of profit, and others would invest in the lowest priced (and most adulterated) goods. Then we should find adulteration on the increase, more stringent preventive Acts would be called for, public analysts busier than ever, and, as is now the case to some extent, the more conscientious dealers would suffer by the constant worry in greater degrce than the unscrupulous. But the public and their representatives are not likely to grant any such monopoly, fortunately. It is both unnecessary and undesirable, whilst the demand for it is most absurd. The only reason that is urged for endeavouring to deprive the grocer of his right to deal in drugs is that he is not examined. And, I would ask, how does that fact at all affect the question as matters now are? How much more than the grocer does the average druggist know, really know, concerning all that he retails? Are the Society's qualifications alone sufficient guarantee that all their possessors hereafter sell is what it ought to be? All do not verify the quality of each drug and chemical before sale, and I maintain that such as do not are not entitled to higher remuneration than the unexamined grocers, and have as little right to look for any monopoly in their business.

Mr. Davis points out a direction in which we may help ourselves greatly, but it is one way only. The modification of conduct is of yet greater importance than the acquirement of culture, and should precede it. "When the character is defective, intellect, no matter how high, fails to regulate rightly, because predominant desires falsify its estimates," and until we all conscientiously perform the duties, the promise to perform which is implied by the assumption of the titles of "chemist and druggist" and "pharmaceutical chemist," we need not depend upon culture to elevate our business position.

I fear that the ideals of the founders of our Society are yet far from being realized, but I still have faith in the ultimate triumph of good.

Sheffield. JOHN HUMPHREY.

"AMORPHOUS COCAINE."

Sir,—In last week's Journal you have criticized a recent paper of mine on "Amorphous Cocaine" (*Pharm. Journ.*, April 23, 1887), and as I object to nearly every point in the criticism I shall, with your permission, reply *seriatim*.

1. You say, "In the paper recently contributed to this Journal by Dr. Stockman, the peculiarity of what is termed amorphous cocaine was attributed to the solubility of the crystallizable alkaloid in hygrine . . . This opinion has been arrived at by Dr. Stockman from a study of the physiological action and chemical relations of what is termed amorphous cocaine, but he gives no account of the experimental grounds upon which the opinion is based."

I gave in my paper the following experimental grounds, which are both chemical and physiological:—(1) Benzoyl-ecgonine was obtained from amorphous cocaine in the same way as from crystallizable cocaine. It is described as being obtained both amorphous and crystalline, and I state distinctly that "chemically and physiologically it resembles benzoyl-ecgonine."

(2) By boiling amorphous cocaine in a sealed tube with hydrochloric acid the same decomposition products are obtained as from crystalline cocaine.

In my paper I describe this fully, and also how the presence of hygrine complicates matters.

(3) The behaviour of amorphous cocaine when water is added to it is fully described, the reasons are discussed, and certain conclusions are drawn.

(4) I obtained (p. 862, line 3, *et seq.*) crystalline from amorphous cocaine. Since the paper was published I have obtained much finer crystals and in larger amounts.

(5) I describe the physiological action of amorphous cocaine as being similar to that of pure cocaine, with the exception, that the amorphous substance produced great local irritation.

II. In the sentences beginning with "So far," and ending with the words "crystallizable base," you express the opinion that amorphous cocaine cannot be a solution of crystalline cocaine in hygrine, because when it is heated the hygrine, although volatile, is not driven off. This is a very common occurrence when a volatile and non-volatile body are intimately mixed together in a large amorphous mass. There are many examples of this. It is almost impossible to drive off chloroform from an amorphous mixture, while acetic acid is also sometimes hardly to be got rid of, although both these bodies are very volatile, much more so than hygrine. Besides, a certain amount of hygrine is given off when amorphous cocaine is heated, as evidenced by the strong smell which is felt.

III. On Dr. Merck's authority it is stated that hygrine is a "purely imaginary substance." In reply to this I say—

(1) It was obtained *from the leaves* by Wöhler and Lossen, and is described by them (*Liebig's Annaleu*, cxxi. and cxxxiii.).

(2) I state in my paper (p. 862, line 23), that I obtained a few drops of hygrine by distilling amorphous cocaine with water. I also shortly describe its action.

(3) Since the publication of my paper, I have received from Messrs. Howards and Sons specimens of hygrine, prepared by distilling amorphous cocaine in a current of steam.

All these specimens are now in my possession, and agree substantially with Wöhler's and Lossen's descriptions of hygrine.

I may state, however, that like Dr. Merck, I attempted without success to obtain hygrine from the leaves. It is probably present in very small amount.

IV. You say, "it seems clear that before Dr. Stockman's suggested explanation of the nature of amorphous cocaine can be accepted the existence of hygrine must be established, and its capability of dissolving crystallizable cocaine demonstrated."

The first part of this sentence I have answered under paragraph 3, and the second part was answered in my paper (p. 861, line 48), where I state that "Cocaine is extremely soluble in hygrine."

My paper was the outcome of a great deal of work on the subject. Every point was carefully investigated and confirmed, and I still hold to the opinions which I have expressed in it.

University, Edinburgh. RALPH STOCKMAN.

T. F. Walker.—Peziza repanda, Wahl.

T. H. Powell.—Claytonia perfoliata.

A. G. Rickarby.—Lathyrus Nissolia.

J. C. Lloyd.—The solution contains sulphur, chiefly in the state of potassium sulphite.

Civitas.—Ribes aureum.

Six Years.—In the future arrangements made by the Council no doubt a reasonable regard will be shown for existing interests.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Pollard, Schweitzer, Elborne, Alcock, Barclay, Redbourne, Perls, Johnson.

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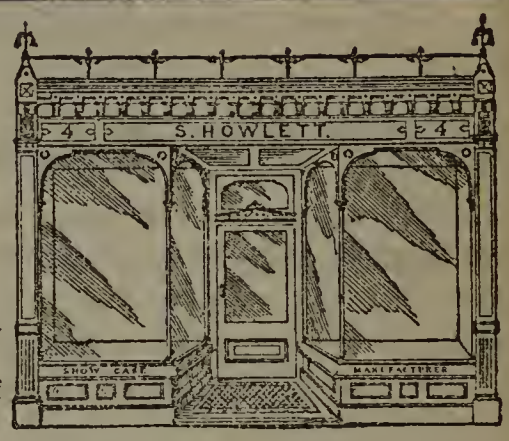

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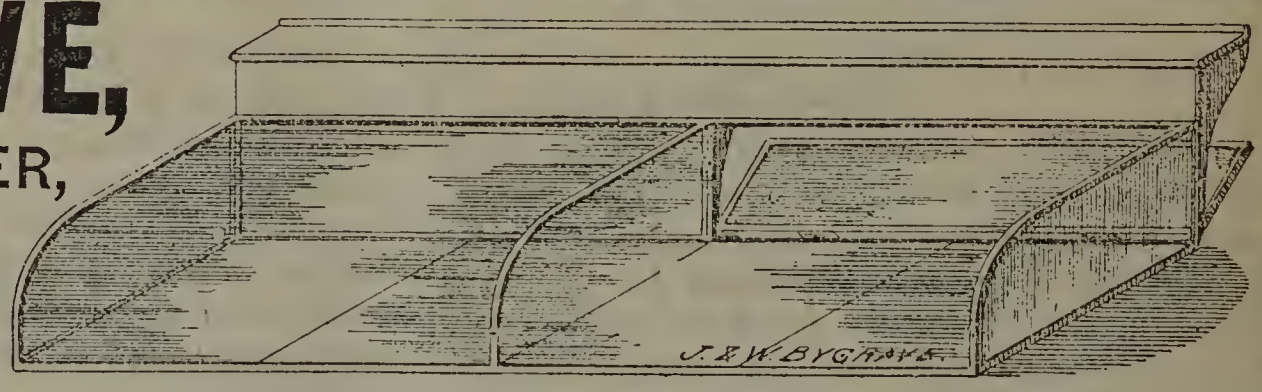

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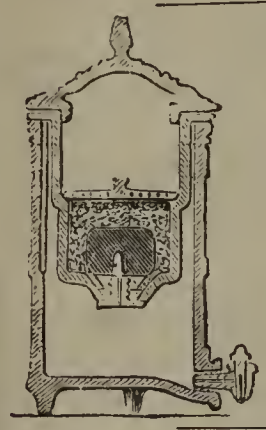

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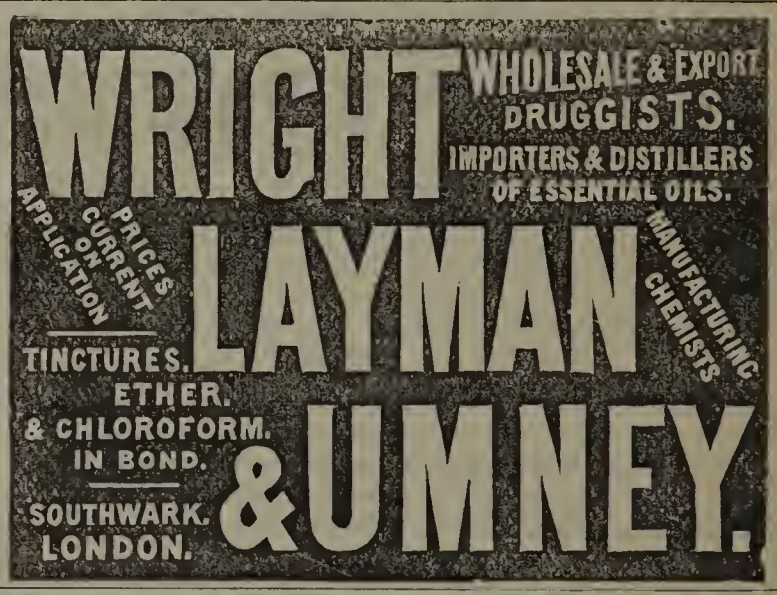

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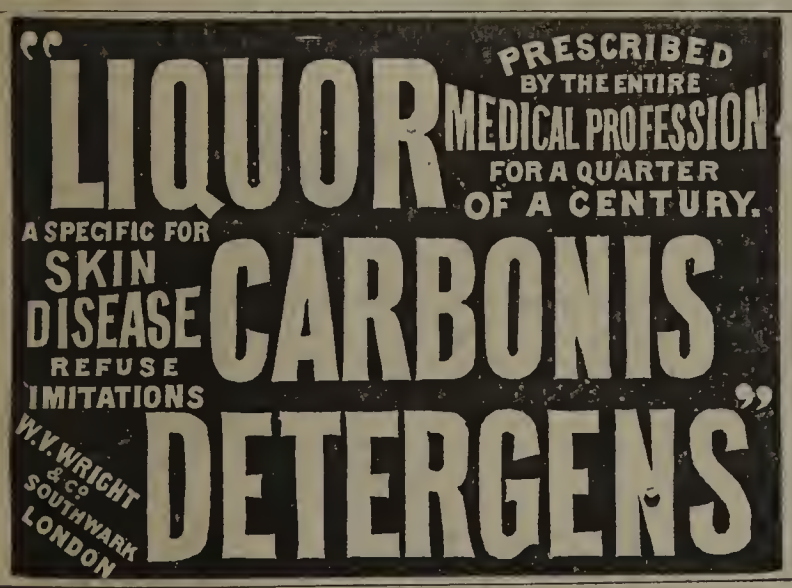

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